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SEARCH REQUEST FORM

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Art Unit: 1623 Phone Number 308-1620 Serial Number: 10/088419
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Please provide a detailed statement of the search topic, and describe as specifically as possible the subject matter to be searched. Include the elected species or structures, keywords, synonyms, acronyms, and registry numbers, and combine with the concept or utility of the invention. Define any terms that may have a special meaning. Give examples or relevant citations, authors, etc, if known. Please attach a copy of the cover sheet, pertinent claims, and abstract.

Title of Invention: See attached bib/assignment sheets

Inventors (please provide full names): _____

Earliest Priority Filing Date: 9-13-00

**For Sequence Searches Only* Please include all pertinent information (parent, child, divisional, or issued patent numbers) along with the appropriate serial number.*

RECEIVED APR - 8 2003 (STIC)

Please search the freeze-thaw stable starch of attached claims 1-8, 12-21, 26-35, 40-42, 44-47, 49-52, 71, 74, 75, and 80.

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CM1 1E07 – 703-308-4498
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Thanks.
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Date Completed:	4/25/03	Litigation		Lexis/Nexis	
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Clerical Prep Time:	15	Patent Family		WWW/Internet	
Online Time:	+ 55	Other		Other (specify)	

PTO-1590 (8-01)

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FILE COVERS 1907 - 25 Apr 2003 VOL 138 ISS 18
FILE LAST UPDATED: 24 Apr 2003 (20030424/ED)

This file contains CAS Registry Numbers for easy and accurate
substance identification.

=> d all tot 149

L49 ANSWER 1 OF 22 HCAPLUS COPYRIGHT 2003 ACS
AN 2002:366822 HCAPLUS
DN 137:62426
TI The influence of **starch** swelling on the material properties of cooked **potatoes**
AU Ormerod, A.; Ralfs, J.; **Jobling, S.**; Gidley, M.
CS Unilever R and D Colworth, Sharnbrook, MK44 1LQ, UK
SO Journal of Materials Science (2002), 37(8), 1667-1673
CODEN: JMTSAS; ISSN: 0022-2461
PB Kluwer Academic Publishers
DT Journal
LA English
CC 17-10 (Food and Feed Chemistry)
AB Cooked **potatoes** have a wide range of food applications, but the mechanism by which softening occurs on **heating** is not clearly understood. **Heating potato** parenchyma tissue results in two independent, concurrent events; weakening of the binding between cells and swelling of intra-cellular **starch**. **Potato** plants contg. **starches** with a range of high **amylose** contents and reduced swelling properties were available. This provided the opportunity to sep. cooking effects of inter-cellular pectin from swelling of intra-cellular **starch**. Their individual contribution to the sepn. of cells and the softening of cooked **potato** tissue was established by studying the influence of **heat** on the material properties of a range of **starch** -modified **potatoes**. For all **potato** lines studied, the strength of the **heated** tissue decreased markedly following 30 min at 80.degree. or 5 min at 100.degree.. Microscopy of the line in which there was minimal **starch** swelling, indicated that the cells of the cooked tissue principally contained fluid, in contrast to the controls in which the cells were filled with swollen **starch** on cooking. Since all the lines followed the same trend with regard to the **thermal** weakening of the tissue, weakening of **potato** tissue on cooking is primarily controlled by **thermal** degrdn. of the middle lamella.
ST **potato** cooking **starch** swelling cell wall
IT Cooking

(boiling; **starch** swelling effect on material properties of cooked **potatoes**)
IT Cell wall
(middle lamella; **starch** swelling effect on material properties of cooked **potatoes**)
IT Food swelling
Food texture
Potato (Solanum tuberosum)
(**starch** swelling effect on material properties of cooked **potatoes**)
IT **9005-25-8, Starch**, biological studies 9005-82-7, **Amylose**
RL: BSU (Biological study, unclassified); PEP (Physical, engineering or chemical process); PYP (Physical process); BIOL (Biological study); PROC (Process)
(**starch** swelling effect on material properties of cooked **potatoes**)
RE.CNT 20 THERE ARE 20 CITED REFERENCES AVAILABLE FOR THIS RECORD
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(8) Greve, L; J Agric Food Chem 1994, V42, P2896 HCAPLUS
(9) Hiller, S; J Mater Sci 1996, V31, P2779 HCAPLUS
(10) Jarvis, M; Potato Research 1992, V35, P93 HCAPLUS
(11) Jobling, S; The Plant Journal 1999, V18, P163 HCAPLUS
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L49 ANSWER 2 OF 22 HCAPLUS COPYRIGHT 2003 ACS
AN 2002:181102 HCAPLUS
DN 136:385090
TI Production of a **freeze-thaw**-stable **potato** **starch** by antisense inhibition of 3 **starch** synthase genes
AU **Jobling, Stephen A.**; **Westcott, Roger J.**; Tayal, Akash; Jeffcoat, Roger; **Schwall, Gerhard P.**
CS Colworth House, Unilever Research, Bedford, MK44 1LQ, UK
SO Nature Biotechnology (2002), 20(3), 295-299
CODEN: NABIF9; ISSN: 1087-0156
PB Nature America Inc.
DT Journal; General Review
LA English
CC 17-0 (Food and Feed Chemistry)
AB A review. The use of unmodified **starches** in **frozen** foods is severely limited by the undesirable textural changes that occur after **freezing** and **thawing**. Retrogradation of **glucan** chains leads to syneresis, a sepn. of the **starch** gel and water phases. Stabilization of **glucan** chains leads to syneresis, a sepn. of the **starch** gel and water phases. Stabilization of the **starch** structure is normally achieved by chem. modification to prevent these changes from occurring. We have now

created a **freeze-thaw**-stable **potato** **starch** by alteration of **starch** compn. and structure by genetic modification. An **amylose**-free **starch** with short-chain **amylopectin** was produced by simultaneous antisense downregulation of 3 **starch** synthase genes. This **starch** is extremely **freeze-thaw** stable and shows no syneresis even after 5 **freeze-thaw** cycles. The use of this **starch** has potential for environmental and consumer benefits because its prodn. requires no chem. modification.

ST review **potato** antisense **starch** synthase gene **freeze thaw** stable

IT Gene, plant
RL: BSU (Biological study, unclassified); BIOL (Biological study)
(GBSS; prodn. of a **freeze-thaw**-stable **potato** **amylose**-free **starch** by antisense inhibition of 3 **starch** synthase genes)

IT **Potato (Solanum tuberosum)**
(prodn. of a **freeze-thaw**-stable **potato** **amylose**-free **starch** by antisense inhibition of 3 **starch** synthase genes)

IT Antisense DNA
RL: BSU (Biological study, unclassified); BIOL (Biological study)
(prodn. of a **freeze-thaw**-stable **potato** **amylose**-free **starch** by antisense inhibition of 3 **starch** synthase genes)

IT **9030-10-8, Starch** synthase
RL: BSU (Biological study, unclassified); BIOL (Biological study)
(**freeze-thaw**-stable **potato** **amylose**-free **starch** with short-chain **amylopectin** by antisense inhibition of 3 **starch** synthase genes)

IT **9005-25-8, Starch**, biological studies
RL: BSU (Biological study, unclassified); **PRP (Properties)**; BIOL (Biological study)
(**freeze-thaw**-stable **potato** **amylose**-free **starch** with short-chain **amylopectin** by antisense inhibition of 3 **starch** synthase genes)

IT **9005-82-7, Amylose 9037-22-3, Amylopectin**
RL: BSU (Biological study, unclassified); BIOL (Biological study)
(prodn. of a **freeze-thaw**-stable **potato** **amylose**-free **starch** by antisense inhibition of 3 **starch** synthase genes)

RE.CNT 18 THERE ARE 18 CITED REFERENCES AVAILABLE FOR THIS RECORD

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(2) Edwards, A; Plant J 1995, V8, P283 HCAPLUS
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L49 ANSWER 3 OF 22 HCAPLUS COPYRIGHT 2003 ACS
AN 2001:412261 HCAPLUS
DN 135:256415
TI **Thermal** transition characteristics and gel properties of **heat**-moisture treated corn and **potato starches**
AU Chung, Hyun-Jung; Chang, Eun-Hee; Lim, Seung-Taik
CS Graduate School of Biotechnology, Korea Univ., Seoul, 136-701, S. Korea
SO Zywnosc (**2000**), 7(2, Supl.), 37-48
CODEN: ZYWNFL
PB Polskie Towarzystwo Technologow Zywnosci, Oddzial Malopolski
DT Journal
LA English
CC 17-11 (Food and Feed Chemistry)
AB Normal corn **starch** contg. 25 or 30% moisture and **potato starch** contg. 20 or 25% moisture were **heat**-moisture treated at 1200C for 1 h and the changes in **thermal** transition characteristics and gel properties of the **starches** were examd. Granular crystallinity on X-ray diffractograms, esp. for **potato starch**, was reduced by the **heat**-moisture treatment (HMT). At a limited moisture content (15% based on total wt.), Tg measured in granular form of **starch** decreased by 2-6.degree.C. At Tg, the change in **heat** capacity (.DELTA.Cp) of the treated **starch** was substantially higher than of the corresponding native **starch**. Crystal melting of the **heat**-moisture treated **starches**, measured at 80% moisture, appeared to be biphasic on a DSC thermogram, in that the original endotherm became smaller while a new endotherm at higher **temp**. was enlarged by the HMT. However, the total melting enthalpy for **starch** decreased, indicating a partial loss of crystallinity. The degree of retrogradation under DSC was not significantly different between the native and treated **starches**. The HMT **starches** formed the gel with more opaqueness and brittleness. The gel stability from **freeze-thawing** treatment was slightly increased with corn **starch**, but decreased with **potato** by the HMT. Overall results on the paste viscosity and gel properties indicated that the HMT provided phys. crosslinking effects on **starch**.
ST **thermal** transition **heat** moisture treated **starch** gel
IT **Temperature** effects, biological
(**heat**; **thermal** transition and gel properties of **heat**-moisture treated corn and **potato starches**)
IT Corn
Crystallinity
Differential scanning calorimetry
Food gels
Fusion enthalpy
Phase transition
Potato (Solanum tuberosum)
(**thermal** transition and gel properties of **heat**-moisture treated corn and **potato starches**)
IT 7732-18-5, water, biological studies **9005-25-8, starch**, biological studies
RL: FFD (Food or feed use); **PRP (Properties)**; BIOL (Biological study); USES (Uses)
(**thermal** transition and gel properties of **heat**-moisture treated corn and **potato starches**)
RE.CNT 19 THERE ARE 19 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
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(12) Kawabata, A; Starch/Staerke 1994, V46, P463 HCAPLUS
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L49 ANSWER 4 OF 22 HCAPLUS COPYRIGHT 2003 ACS
AN 2001:208404 HCAPLUS
DN 134:249650
TI Transgenic **potatoes** with altered activity in two or more **starch**-modifying enzymes and **starch** with modified properties
IN **Jobling, Stephen Alan; Schwall, Gerhard Peter; Westcott, Roger John**
PA National Starch and Chemical Investment Holding Corporation, USA
SO PCT Int. Appl., 77 pp.
CODEN: PIXXD2
DT Patent
LA English
IC ICM C12N015-00
CC 11-1 (Plant Biochemistry)
Section cross-reference(s): 3, 7, 17
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2001019975	A2	20010322	WO 2000-GB3522	20000913 <--
	WO 2001019975	A3	20010927		
	W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
	RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG				
	EP 1212440	A2	20020612	EP 2000-958901	20000913 <--
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL				
	JP 2003509047	T2	20030311	JP 2001-523747	20000913 <--
PRAI	GB 1999-21830	A	19990915 <--		
	WO 2000-GB3522	W	20000913 <--		

AB Disclosed is **potato starch** which, when in native form extd. from a **potato** plant, exhibits **freeze/thaw** stability such that a 1 %w/v aq. suspension of the **starch** has an absorbance at 700nm wavelength of less than 1.2 units following 4 **freeze/thaw** cycles of **freezing** at -70 >C overnight and **thawing** at room **temp.** for at least 2 h; together with a method of altering the **starch** content of a plant; and altered plants, esp. altered plants which contain **freeze/thaw** stable **starch**.

Further disclosed is waxy (i.e. low **amylose**) **starch** having reduced gelatinization onset and swelling **temps**. The **starch** is synthesized in transgenic **potatoes** with altered levels of three isoenzymes of **starch** synthase (granule-bound **starch** synthase I (GBSSI), and isoenzymes II and III). This can be achieved by lowering the levels of the enzymes using antisense DNA to block gene expression. Plants lacking all three activities were constructed by serial transformation with antisense DNAs for all three genes. **Amylose** content was most sensitive to levels of GBSSI. **Starch** granule **amylose** content was lowered to 3-11% and the granules had an altered, cracked, morphol. These **starches** showed lowered initial swelling **temps**. and lower final viscosities.

ST **starch** compn gelatinization retrogradation **potato**; synthase **starch** isoenzyme level **potato** retrogradation gelatinization

IT Gene, plant
RL: AGR (Agricultural use); BSU (Biological study, unclassified); PRP (Properties); BIOL (Biological study); USES (Uses)
(amf, for granule-bound **starch** synthase I of **potato** ; transgenic **potatoes** with altered activity in two or more **starch**-modifying enzymes and **starch** with modified properties)

IT DNA sequences
(for **starch** synthase of **potato**; transgenic **potatoes** with altered activity in two or more **starch** -modifying enzymes and **starch** with modified properties)

IT Recrystallization
(**freeze-thaw** induced, **starch** resistance to; transgenic **potatoes** with altered activity in two or more **starch**-modifying enzymes and **starch** with modified properties)

IT Antisense DNA
RL: AGR (Agricultural use); BIOL (Biological study); USES (Uses)
(in inhibition of **starch** synthase gene expression; transgenic **potatoes** with altered activity in two or more **starch** -modifying enzymes and **starch** with modified properties)

IT Breeding, plant
(of **potato** for altered **starch** properties; transgenic **potatoes** with altered activity in two or more **starch**-modifying enzymes and **starch** with modified properties)

IT Genetic engineering
(of **potato starch** properties; transgenic **potatoes** with altered activity in two or more **starch** -modifying enzymes and **starch** with modified properties)

IT Protein sequences
(of **starch** synthase of **potato**; transgenic **potatoes** with altered activity in two or more **starch** -modifying enzymes and **starch** with modified properties)

IT Food gelling
(**starch** with altered gelling behavior; transgenic **potatoes** with altered activity in two or more **starch** -modifying enzymes and **starch** with modified properties)

IT **Potato (Solanum tuberosum)**
(transgenic **potatoes** with altered activity in two or more **starch**-modifying enzymes and **starch** with modified properties)

IT Plant cell
(transgenic; transgenic **potatoes** with altered activity in two or more **starch**-modifying enzymes and **starch** with modified properties)

IT **9030-10-8, Starch** synthase

RL: AGR (Agricultural use); BPR (Biological process); BSU (Biological study, unclassified); CAT (Catalyst use); BIOL (Biological study); PROC (Process); USES (Uses)
(altering relative levels of isoenzymes of; transgenic **potatoes** with altered activity in two or more **starch**-modifying enzymes and **starch** with modified properties)

IT **9012-72-0, Glucan**
RL: AGR (Agricultural use); BOC (Biological occurrence); BSU (Biological study, unclassified); BIOL (Biological study); OCCU (Occurrence); USES (Uses)
(altering relative levels of long and short forms in **starch**; transgenic **potatoes** with altered activity in two or more **starch**-modifying enzymes and **starch** with modified properties)

IT **9005-82-7, Amylose 9037-22-3, Amylopectin**
RL: BOC (Biological occurrence); BSU (Biological study, unclassified); FFD (Food or feed use); MFM (Metabolic formation); PRP (Properties); BIOL (Biological study); FORM (Formation, nonpreparative); OCCU (Occurrence); USES (Uses)
(altering **starch** content of; transgenic **potatoes** with altered activity in two or more **starch**-modifying enzymes and **starch** with modified properties)

IT **330869-84-6**
RL: BSU (Biological study, unclassified); PRP (Properties); BIOL (Biological study)
(amino acid sequence; transgenic **potatoes** with altered activity in two or more **starch**-modifying enzymes and **starch** with modified properties)

IT 140824-92-6, GenBank X58453
RL: BSU (Biological study, unclassified); PRP (Properties); BIOL (Biological study)
(nucleotide sequence; transgenic **potatoes** with altered activity in two or more **starch**-modifying enzymes and **starch** with modified properties)

IT **9005-25-8, Starch**, biological studies
RL: BSU (Biological study, unclassified); FFD (Food or feed use); MFM (Metabolic formation); **PRP (Properties)**; BIOL (Biological study); FORM (Formation, nonpreparative); USES (Uses)
(transgenic **potatoes** with altered activity in two or more **starch**-modifying enzymes and **starch** with modified properties)

L49 ANSWER 5 OF 22 HCAPLUS COPYRIGHT 2003 ACS
AN 2000:549377 HCAPLUS
DN 133:221771
TI Deep-**freezing** of **potato starch**
AU Szymonska, Joanna; Krok, Franciszek; Tomasik, Piotr
CS Department of Chemistry, Agriculture University, Krakow, 30-059, Pol.
SO International Journal of Biological Macromolecules (**2000**), 27(4), 307-314
CODEN: IJBMDR; ISSN: 0141-8130
PB Elsevier Science B.V.
DT Journal
LA English
CC 17-4 (Food and Feed Chemistry)
AB Samples of oven-dried, air-dried, and moisturized **potato starch** (5, 13, and 24% wt./wt. moisture content, resp.) were **frozen** in liq. nitrogen. Samples after **thawing** were studied by means of cross-polarized light beam microscope, Fourier Transformation IR Spectroscope (FT-IR), powder x-ray diffractometer, and non-contact At. Force Microscope (nc-AFM). Rapid deep-**freezing** followed by **thawing** produced changes on the granule surface.

They were accompanied by internal alteration manifested by FT-IR spectra and powder x-ray diffractograms. The results depended on the water content in the sample. Deep-**freezing** of moistened **starch** resulted in increased crystallinity of granules. It had minor effect on the granule aq. soly. and characteristics of gelation.

ST deep **freezing potato starch**

IT **Freezing**
(deep-; of **potato starch**)

IT Crystallinity
Food functional properties
Food gelling
Food processing
Food solubility
Food viscosity
Humidity
Potato (Solanum tuberosum)
Water binding (food)
(deep-**freezing** of **potato starch**)

IT Organelle
(granule; deep-**freezing** of **potato starch**)

IT **9005-25-8, Starch**, properties
RL: **PRP (Properties)**
(deep-**freezing** of **potato starch**)

RE.CNT 41 THERE ARE 41 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

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L49 ANSWER 6 OF 22 HCAPLUS COPYRIGHT 2003 ACS
AN 2000:347082 HCAPLUS
DN 133:86722
TI Production of very-high-**amylose potato starch** by inhibition of SBE A and B
AU **Schwall, Gerhard P.**; Safford, Richard; **Westcott, Roger J.**; Jeffcoat, Roger; Tayal, Akash; Shi, Yong-Cheng; Gidley, Michael J.; **Jobling, Stephen A.**
CS Unilever Research Colworth, Sharnbrook, Bedford, MK44 1LQ, UK
SO Nature Biotechnology (**2000**), 18(5), 551-554
CODEN: NABIF9; ISSN: 1087-0156
PB Nature America Inc.
DT Journal
LA English
CC 11-1 (Plant Biochemistry)
Section cross-reference(s): 17, 44
AB High-**amylose starch** is in great demand by the **starch** industry for its unique functional properties. However, very few high-**amylose** crop varieties are com. available. The generation of very-high-**amylose potato starch** was obtained by genetic modification. This was achieved by simultaneously inhibiting two isoforms of **starch** branching enzyme to below 1% of the wild-type activities. **Starch** granule morphol. and compn. were noticeably altered. Normal, high-mol.-wt. **amylopectin** was absent, whereas the **amylose** content was increased to levels comparable to the highest com. available maize **starches**. In addn., the phosphorus content of the **starch** was increased more than fivefold. This unique **starch**, with its high **amylose**, low **amylopectin**, and high phosphorus levels, offers novel properties for food and industrial applications.
ST **amylose starch potato** branching enzyme; genetic transformation **potato amylose starch**
IT **Potato (Solanum tuberosum)**
Transformation, genetic
(prodn. of very-high-**amylose potato starch** by inhibition of **starch**-branching enzyme A and B)
IT 7723-14-0, Phosphorus, biological studies **9001-97-2**, **Starch** branching enzyme **9005-25-8**, **Starch**, biological studies 9005-82-7, **Amylose 9037-22-3**, **Amylopectin**
RL: BOC (Biological occurrence); BSU (Biological study, unclassified); BIOL (Biological study); OCCU (Occurrence)
(prodn. of very-high-**amylose potato starch** by inhibition of **starch**-branching enzyme A and B)
RE.CNT 14 THERE ARE 14 CITED REFERENCES AVAILABLE FOR THIS RECORD
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L49 ANSWER 7 OF 22 HCAPLUS COPYRIGHT 2003 ACS
AN 1999:811367 HCAPLUS
DN 132:31779
TI Improvements in or relating to plants and plant **starch** products resulting from transformation with antisense **starch** synthase constructs
IN Edwards, Elizabeth Anne; **Jobling, Stephen Alan**; Martin, Catherine Rosemary; **Schwall, Gerhard Peter**; Smith, Alison Mary; **Westcott, Roger John**
PA National Starch and Chemical Investment Holding Corporation, USA
SO PCT Int. Appl., 50 pp.
CODEN: PIXXD2
DT Patent
LA English
IC ICM C12N015-54
ICS C12N015-82; C08B030-04; A01H005-00
CC 3-2 (Biochemical Genetics)
Section cross-reference(s): 11, 17, 40, 43, 44
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE	
PI	WO 9966050	A1	19991223	WO 1999-GB1902	19990615	<--
	W: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM					
	RW: GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG					
	CA 2331300	AA	19991223	CA 1999-2331300	19990615	<--
	AU 9943802	A1	20000105	AU 1999-43802	19990615	<--
	EP 1092033	A1	20010418	EP 1999-926617	19990615	<--
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI					
	JP 2002518015	T2	20020625	JP 2000-554859	19990615	<--
PRAI	EP 1998-304716	A	19980615	<--		
	WO 1999-GB1902	W	19990615	<--		

AB A method for modifying plants by manipulating the activity of a combination of plant enzymes having **starch** synthase activity, in particular **starch** synthase II (SSII) and **starch** synthase III (SSIII). Modified plants, their use as food products and **starch**, in particular obtained from a modified **potato** plant, having novel properties and uses thereof are also disclosed. **Starch** extd. from **potato** plants transformed by introduction of and SSII/SSIII combination operably linked in the antisense orientation to a suitable promoter, has a viscosity onset **temp**. as detd. by viscoamylograph, which is significantly reduced compared to the effects predicted by reducing the 2 isoforms individually or in unmodified plants. The modified **starch** may have uses in food processing and other applications, such as in the paper, textiles, and adhesives industries (no data).
ST plant transformation antisense **starch** synthase; **potato** transformation antisense **starch** synthase
IT Adhesives
Barley
Cassava (Manihot esculenta)
Corn
Food processing
Paper

Pea
Plant (Embryophyta)
Potato (Solanum tuberosum)
Rice (Oryza sativa)
Textiles
Tomato
Transformation, genetic
Wheat
(improvements in or relating to plants and plant **starch** products resulting from transformation with antisense **starch** synthase constructs)

IT Antisense DNA
RL: BUU (Biological use, unclassified); BIOL (Biological study); USES (Uses)
(improvements in or relating to plants and plant **starch** products resulting from transformation with antisense **starch** synthase constructs)

IT Plasmid vectors
(pPOT17 and pSJ42 and pSJ119; improvements in or relating to plants and plant **starch** products resulting from transformation with antisense **starch** synthase constructs)

IT **9030-10-8, Starch** synthase
RL: BPR (Biological process); BSU (Biological study, unclassified); BUU (Biological use, unclassified); BIOL (Biological study); PROC (Process); USES (Uses)
(II and III; improvements in or relating to plants and plant **starch** products resulting from transformation with antisense **starch** synthase constructs)

IT **9005-25-8DP, Starch**, modified, biological studies
RL: **BMF (Bioindustrial manufacture)**; FFD (Food or feed use); NUU (Other use, unclassified); **PRP (Properties)**; BIOL (Biological study); **PREP (Preparation)**; USES (Uses)
(improvements in or relating to plants and plant **starch** products resulting from transformation with antisense **starch** synthase constructs)

RE.CNT 11 THERE ARE 11 CITED REFERENCES AVAILABLE FOR THIS RECORD
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L49 ANSWER 8 OF 22 HCAPLUS COPYRIGHT 2003 ACS
AN 1999:636767 HCAPLUS
DN 131:335948
TI The potential of hull-less barley
AU Bhatty, R. S.
CS Crop Development Centre, Department of Plant Sciences, University of Saskatchewan, Saskatoon, SK, S7N 5A8, Can.
SO Cereal Chemistry (**1999**), 76(5), 589-599
CODEN: CECHAF; ISSN: 0009-0352
PB American Association of Cereal Chemists
DT Journal; General Review
LA English
CC 17-0 (Food and Feed Chemistry)
AB A review with 124 refs. Hull-less barley (HB) has been investigated in

many countries for use in feed, food, and industry since the publication of the last review in 1986. Literature published since 1990 on various aspects of HB utilization, other than in monogastric feeds, has been reviewed. Several HB cultivars contg. low or high .beta.-**glucan**, low or high ext. viscosity, and waxy (0-5% **amylose**) or normal **starch** are now available. Interest in HB utilization in the food industry developed largely due to its high .beta.-**glucan** content, particularly in the waxy cultivars. .beta.-**Glucan** is a major component of sol. fiber implicated in hypocholesterolemia, hypoglycemia, and in reducing incidence of chem. induced colon cancer in exptl. animals. However, large-scale clin. trials using human subjects are needed to corroborate these effects. The zero **amylose** HB **starch** had low syneresis or a high **freeze-thaw** stability suitable for use in **frozen** foods. Single- or double-modified waxy HB **starch** may replace corn **starch** in some food applications, and cationized HB **starch** can replace corn and **potato starches** in the pulp and paper industry. HB may be milled using conventional wheat milling equipment to yield bran and flour for multiple food uses. Hull-less barley may also be used as feed stock for fuel alc. prodn., for the prepn. of food malt with low or high enzyme activities, and for brewer's and distiller's malts.

ST review hulless barley feed food industry

IT Food industry
(feed; the potential of hulless barley)

IT Barley
(hulless; the potential of hulless barley)

IT Food industry
Industry
(the potential of hulless barley)

IT **9005-25-8**, **Starch**, biological studies
RL: BOC (Biological occurrence); BSU (Biological study, unclassified); **PRP (Properties)**; BIOL (Biological study); OCCU (Occurrence)
(the potential of hulless barley)

RE.CNT 124 THERE ARE 124 CITED REFERENCES AVAILABLE FOR THIS RECORD

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L49 ANSWER 9 OF 22 HCAPLUS COPYRIGHT 2003 ACS
AN 1999:369240 HCAPLUS
DN 131:115640
TI Assessment of some parameters involved in the gelatinization and retrogradation of **starch**
AU Garcia-Alonso, Alejandra; Jimenez-Escrig, Antonio; Martin-Carron, Nuria; Bravo, Laura; Saura-Calixto, Fulgencio
CS Departamento de Metabolismo y Nutricion, Instituto del Frio, Consejo Superior de Investigaciones Cientificas, (CSIC), Madrid, 28040, Spain
SO Food Chemistry (**1999**), 66(2), 181-187
CODEN: FOCHDJ; ISSN: 0308-8146
PB Elsevier Science Ltd.
DT Journal
LA English
CC 17-11 (Food and Feed Chemistry)
AB Factors influencing the formation of resistant **starch** (RS) during gelatinization and retrogradation were studied in **starches** and flours from cereals (wheat, corn, rice) and **potato**. RS obtained using a high-pressure autoclave system varied between 3.94 and 21.21% (rice and **potato starches**, resp.) similar to the values obtained after gelatinization in a boiling water bath. Except for rice, RS was higher in pure **starches** than in flours. Stirring during gelatinization yielded more homogeneous products than non-stirred samples. Apparently, gelatinization was unaffected by pH values between 3.5 and 10.5. To obtain optimum RS yields during retrogradation, it was necessary to **cool** down **starch**

gels prior to **freezing**, followed by **thawing** at room **temp.** and drying at 60.degree.C. These conditions ensure good yields in the formation of RS with potential industrial applications.

ST **starch** resistant gelatinization retrogradation

IT Flours and Meals
Flours and Meals
(corn; parameters involved in gelatinization and retrogradation of **starch**)

IT Corn
Potato (Solanum tuberosum)
Potato (Solanum tuberosum)
Rice (Oryza sativa)
Rice (Oryza sativa)
(flour; parameters involved in gelatinization and retrogradation of **starch**)

IT Corn
(meal; parameters involved in gelatinization and retrogradation of **starch**)

IT Digestibility
Drying
Food gelling
Freezing
Recrystallization
Wheat flour
(parameters involved in gelatinization and retrogradation of **starch**)

IT Flours and Meals
Flours and Meals
(**potato** flour; parameters involved in gelatinization and retrogradation of **starch**)

IT Flours and Meals
Flours and Meals
(rice; parameters involved in gelatinization and retrogradation of **starch**)

IT Mixing
(stirring; parameters involved in gelatinization and retrogradation of **starch**)

IT **9005-25-8, Starch**, biological studies
RL: FFD (Food or feed use); PEP (Physical, engineering or chemical process); **PRP (Properties)**; BIOL (Biological study); PROC (Process); USES (Uses)
(parameters involved in gelatinization and retrogradation of **starch**)

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HCAPLUS
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L49 ANSWER 10 OF 22 HCAPLUS COPYRIGHT 2003 ACS
AN 1999:362442 HCAPLUS
DN 131:181600
TI A minor form of **starch** branching enzyme in **potato** (**Solanum tuberosum** L.) **tubers** has a major effect on **starch** structure: cloning and characterisation of multiple forms of SBE A
AU **Jobling, Stephen A.**; **Schwall, Gerhard P.**; **Westcott, Roger J.**; Sidebottom, Christopher M.; Debet, Martine; Gidley, Michael J.; Jeffcoat, Roger; Safford, Richard
CS Unilever Research, Bedford, MK44 1LQ, UK
SO Plant Journal (**1999**), 18(2), 163-171
CODEN: PLJUED; ISSN: 0960-7412
PB Blackwell Science Ltd.
DT Journal
LA English
CC 7-5 (Enzymes)
Section cross-reference(s): 3, 11
AB Full length cDNAs encoding a second **starch** branching enzyme (SBE A) isoform have been isolated from **potato tubers**. The predicted protein has a mol. mass of 101 kDa including a transit peptide of 48 amino acids. Multiple forms of the SBE A gene exist which differ mainly in the length of a polyglutamic acid repeat at the C-terminus of the protein. Expression of the mature protein in Escherichia coli demonstrates that the gene encodes an active SBE. Northern anal. demonstrates that SBE A mRNA is expressed at very low levels in **tubers** but is the predominant isoform in leaves. This expression pattern was confirmed by Western anal. using isoform specific polyclonal antibodies raised against E. coli expressed SBE A. SBE A protein is found predominantly in the sol. phase of **tuber** exts., indicating a stromal location within the plastid. Transgenic **potato** plants expressing an antisense SBE A RNA were generated in which almost complete redns. in SBE A were obsd. SBE activity in the leaves of these plants was severely reduced, but **tuber** activity was largely unaffected. Even so, the compn. and structure of **tuber starch** from these plants was greatly altered. The proportion of linear chains was not significantly increased but the av. chain length of **amylopectin** was greater, resulting in an increase in apparent **amylose**

content as judged by iodine binding. In addn., the **starch** had much higher levels of phosphorous.

ST **starch** branching enzyme isoenzyme **potato** cDNA sequence

IT Leaf
Plastid
Potato (Solanum tuberosum)
Protein sequences
Tuber (plant organ)
cDNA sequences
(minor form of **starch** branching enzyme in **potato** **tubers** has major effect on **starch** structure: cloning and characterization of multiple forms of SBE A)

IT Chloroplast
(stroma; minor form of **starch** branching enzyme in **potato tubers** has major effect on **starch** structure: cloning and characterization of multiple forms of SBE A)

IT 184855-10-5 239792-06-4 239792-07-5 239792-08-6 239792-09-7 239792-10-0 239792-11-1
RL: BAC (Biological activity or effector, except adverse); BOC (Biological occurrence); BSU (Biological study, unclassified); PRP (Properties); BIOL (Biological study); OCCU (Occurrence)
(amino acid sequence; minor form of **starch** branching enzyme in **potato tubers** has major effect on **starch** structure: cloning and characterization of multiple forms of SBE A)

IT **9001-97-2, Starch** branching enzyme
RL: BAC (Biological activity or effector, except adverse); BOC (Biological occurrence); BSU (Biological study, unclassified); PRP (Properties); BIOL (Biological study); OCCU (Occurrence)
(minor form of **starch** branching enzyme in **potato** **tubers** has major effect on **starch** structure: cloning and characterization of multiple forms of SBE A)

IT **9005-25-8, Starch**, biological studies **9005-82-7, Amylose 9037-22-3, Amylopectin**
RL: BSU (Biological study, unclassified); MFM (Metabolic formation); **PRP (Properties)**; BIOL (Biological study); FORM (Formation, nonpreparative)
(minor form of **starch** branching enzyme in **potato** **tubers** has major effect on **starch** structure: cloning and characterization of multiple forms of SBE A)

IT 7723-14-0, Phosphorus, biological studies
RL: BOC (Biological occurrence); BSU (Biological study, unclassified); BIOL (Biological study); OCCU (Occurrence)
(minor form of **starch** branching enzyme in **potato** **tubers** has major effect on **starch** structure: phosphorus levels in **starch**)

IT 225559-14-8, GenBank AJ011885 225559-15-9, GenBank AJ011886 225559-16-0, GenBank AJ011887 225559-17-1, GenBank AJ011888 225559-18-2, GenBank AJ011889 225559-19-3, GenBank AJ011890 225559-20-6, GenBank AJ011891
RL: BOC (Biological occurrence); BSU (Biological study, unclassified); PRP (Properties); BIOL (Biological study); OCCU (Occurrence)
(nucleotide sequence; minor form of **starch** branching enzyme in **potato tubers** has major effect on **starch** structure: cloning and characterization of multiple forms of SBE A)

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L49 ANSWER 11 OF 22 HCAPLUS COPYRIGHT 2003 ACS
AN 1999:194160 HCAPLUS
DN 130:233256
TI Improvements in or relating to stability of plant **starches** by transformation with isoamylase-type or pullulanase-type debranching enzymes
IN **Jobling, Stephen Alan; Schwall, Gerhard Peter; Westcott, Roger John**
PA National Starch and Chemical Investment Holding Corporation, USA
SO PCT Int. Appl., 51 pp.
CODEN: PIXXD2
DT Patent
LA English
IC ICM C07H021-00
CC 3-2 (Biochemical Genetics)
Section cross-reference(s): 7, 11
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 9912950	A2	19990318	WO 1998-GB2665	19980904 <--
	WO 9912950	A3	19990506		
	W: AU, CA, US				
	RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE				
	CA 2302639	AA	19990318	CA 1998-2302639	19980904 <--
	AU 9889911	A1	19990329	AU 1998-89911	19980904 <--
	EP 1009751	A2	20000621	EP 1998-941593	19980904 <--

R: AT, BE, DE, DK, ES, FR, GB, GR, IT, NL, SE, PT, FI
PRAI GB 1997-18863 A 19970906 <--
WO 1998-GB2665 W 19980904 <--
AB Disclosed are nucleic acid sequences obtainable from **potato** plants and carrying at least a portion of an isoamylase enzyme gene, together with constructs and host cells comprising the nucleic acid sequence, and methods of using the nucleic acid sequence. Thus, cDNA and genomic clones encoding isoamylase-type and pullulanase-type debranching enzymes from **potato** are provided. A plant transformation vector with the hygromycin selectable marker is constructed in which a 1.5-kb isoamylase cDNA from plasmid pSJ132 is inserted in an antisense orientation under the control of granule-bound **starch** synthase promoter. The vector (pSJ138) is used to transform wild-type and waxy **potato** plants.
ST isoamylase pullulanase gene cDNA sequence **potato**; plant **starch** transformation isoamylase pullulanase
IT Barley
Cassava (Manihot esculenta)
Corn
Genetic engineering
Molecular cloning
Oat
Pea
Plant (Embryophyta)
Potato (Solanum tuberosum)
Rice (Oryza sativa)
Sweet **potato**
Transformation, genetic
Wheat
(improvements in or relating to stability of plant **starches** by transformation with isoamylase-type or pullulanase-type debranching enzymes)
IT Gene, plant
RL: BPN (Biosynthetic preparation); BUU (Biological use, unclassified); PRP (Properties); BIOL (Biological study); PREP (Preparation); USES (Uses)
(improvements in or relating to stability of plant **starches** by transformation with isoamylase-type or pullulanase-type debranching enzymes)
IT 221267-04-5P 221267-11-4P
RL: BPN (Biosynthetic preparation); BUU (Biological use, unclassified); PRP (Properties); BIOL (Biological study); PREP (Preparation); USES (Uses)
(amino acid sequence; improvements in or relating to stability of plant **starches** by transformation with isoamylase-type or pullulanase-type debranching enzymes)
IT 9067-73-6P, Isoamylase **9075-68-7P**, Pullulanase
RL: BPN (Biosynthetic preparation); BUU (Biological use, unclassified); PRP (Properties); BIOL (Biological study); PREP (Preparation); USES (Uses)
(improvements in or relating to stability of plant **starches** by transformation with isoamylase-type or pullulanase-type debranching enzymes)
IT **9005-25-8**, **Starch**, biological studies
RL: BPR (Biological process); BSU (Biological study, unclassified); BIOL (Biological study); PROC (Process)
(improvements in or relating to stability of plant **starches** by transformation with isoamylase-type or pullulanase-type debranching enzymes)
IT 221266-62-2P 221266-65-5P 221266-68-8P 221266-70-2P 221266-75-7P
221266-79-1P 221266-87-1P 221266-95-1P 221267-00-1P 221267-07-8P
RL: BPN (Biosynthetic preparation); BUU (Biological use, unclassified); PRP (Properties); BIOL (Biological study); PREP (Preparation); USES (Uses)
(nucleotide sequence; improvements in or relating to stability of plant **starches** by transformation with isoamylase-type or pullulanase-type debranching enzymes)

L49 ANSWER 12 OF 22 HCAPLUS COPYRIGHT 2003 ACS
AN 1999:180580 HCAPLUS
DN 131:2771
TI A combined reduction in activity of **starch** synthases II and III of **potato** has novel effects on the **starch** of **tubers**
AU Edwards, Anne; Fulton, Daniel C.; Hylton, Christopher M.; **Jobling, Stephen A.**; Gidley, Michael; Rossner, Ute; Martin, Cathie; Smith, Alison M.
CS John Innes Centre, Norwich, NR4 7UH, UK
SO Plant Journal (**1999**), 17(3), 251-261
CODEN: PLJUED; ISSN: 0960-7412
PB Blackwell Science Ltd.
DT Journal
LA English
CC 11-1 (Plant Biochemistry)
AB A chimeric antisense construct has been used to generate transgenic **potatoes** (**Solanum tuberosum** L.) in which activities of both of the main **starch** synthases responsible for **amylopectin** synthesis in the **tuber** (SSII and SSIII) are reduced. The properties of **starch** from **tubers** of these plants have been compared with those of **starches** from transgenic plants in which activity of either SSII or SSIII has been reduced. **Starches** from the three types of transgenic plant are qual. different from each other and from the **starch** of control plants with unaltered **starch** synthase activities, with respect to granule morphol., the branch lengths of **amylopectin**, and the gelatinization behavior analyzed by viscometry. The effects of reducing SSII and SSIII together cannot be predicted from consideration of the effects of reducing these two isoforms individually. These results indicate that different isoforms of **starch** synthase make distinct contributions to the synthesis of **amylopectin**, and that they act in a synergistic manner, rather than independently, during **amylopectin** synthesis.
ST **starch** synthase isoform **amylopectin potato**
IT **Potato (Solanum tuberosum)**
(combined redn. in activity of **starch** synthases II and III of **potato** has novel effects on the **starch** of **tubers**)
IT **9030-10-8, Starch** synthase
RL: BSU (Biological study, unclassified); BIOL (Biological study)
(I and II; combined redn. in activity of **starch** synthases II and III of **potato** has novel effects on the **starch** of **tubers**)
IT **9037-22-3, Amylopectin**
RL: BOC (Biological occurrence); BPR (Biological process); BSU (Biological study, unclassified); BIOL (Biological study); OCCU (Occurrence); PROC (Process)
(combined redn. in activity of **starch** synthases II and III of **potato** has novel effects on the **starch** of **tubers**)
IT **9005-25-8, Starch**, biological studies
RL: BOC (Biological occurrence); BPR (Biological process); BSU (Biological study, unclassified); **PRP (Properties)**; BIOL (Biological study); OCCU (Occurrence); PROC (Process)
(combined redn. in activity of **starch** synthases II and III of **potato** has novel effects on the **starch** of **tubers**)
RE.CNT 24 THERE ARE 24 CITED REFERENCES AVAILABLE FOR THIS RECORD
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L49 ANSWER 13 OF 22 HCAPLUS COPYRIGHT 2003 ACS
AN 1998:609257 HCAPLUS
DN 129:315237
TI Rheological Properties of Sago **Starch**
AU Ahmad, Fasihuddin B.; Williams, Peter A.
CS Centre For Water Soluble Polymers, North East Wales Institute, Wrexham, LL11 2AW, UK
SO Journal of Agricultural and Food Chemistry (**1998**), 46(10), 4060-4065
CODEN: JAFCAU; ISSN: 0021-8561
PB American Chemical Society
DT Journal
LA English
CC 17-4 (Food and Feed Chemistry)
AB The swelling characteristics and rheol. properties of 11 sago **starches** were studied and compared to a no. of commonly used **starches**. The swelling power of the sago **starches** were all very similar except for 2 samples which were known to contain a lower mol. mass **amylose** component. The swelling and soly. for these 2 samples were higher than the rest. The values for sago **starches** were similar to that for **potato** and tapioca **starch**, but higher than maize and pea **starch**. The storage modulus, G', of the sago **starches** as studied by small deformation oscillation measurements showed a rapid initial increase in G' followed by the development of a pseudo-plateau. The dependence of G' on the mol. mass of the **amylose** followed the relationship G' .varies. M-0.4. Gels were formed only at sago **starch** concns. of >3.5%, corresponding to an **amylose** concn. of .apprx. 1.0% and varied with concn. according to the relationship G' .varies. C1.8 and G' .varies. C2.5 for high and low **amylose** mol. mass samples, resp. Gel strength (GS) measurements also confirmed that the min. concn. for gelation was .apprx.3.5% and that GS .varies. C2.0. Sago **starches** showed good **freeze-thaw** stability compared to other **starch** types.
ST Sago **starch** rheol property
IT Food rheology
(of Sago **starch**)
IT Food functional properties
Food gelling
Food solubility

Food swelling
Freezing
(rheol. properties of Sago **starch**)
IT **9005-25-8, Starch,** properties
RL: **PRP (Properties)**
(Sago; rheol. properties of)
RE.CNT 38 THERE ARE 38 CITED REFERENCES AVAILABLE FOR THIS RECORD
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L49 ANSWER 14 OF 22 HCAPLUS COPYRIGHT 2003 ACS
AN 1998:508745 HCAPLUS
DN 129:214130
TI Consequences of antisense RNA inhibition of **starch** branching enzyme activity on properties of **potato starch**
AU Safford, Richard; **Jobling, Steve A.**; Sidebottom, Chris M.; **Westcott, Roger J.**; Cooke, David; Tober, Karen J.; Strongitharm, Barbara H.; Russell, Alison L.; Gidley, Michael J.
CS Biosciences Division, Unilever Research, Sharnbrook, MK 441LQ, UK
SO Carbohydrate Polymers (**1998**), 35(3-4), 155-168
CODEN: CAPOD8; ISSN: 0144-8617
PB Elsevier Science Ltd.
DT Journal
LA English
CC 11-1 (Plant Biochemistry)

Section cross-reference(s): 7, 33

AB Antisense constructs contg. cDNAs for **potato starch** branching enzyme (SBE) were introduced into **potato** (**Solanum tuberosum** L.). A population of transgenic plants were generated in which **tuber** SBE activity was reduced by between 5 and 98% of control values. No significant differences in **amylose** content or **amylopectin** branch length profiles of transgenic **tuber starches** were obsd. as a function of **tuber** SBE activity. **Starches** obtained from low SBE activity plants showed elevated phosphorus content. 31P-NMR anal. showed that this was due to proportionate increases in both 3- and 6-linked **starch** phosphates. A consistent alteration in **starch** gelatinization properties was only obsd. when the level of SBE activity was reduced to below .apprx.5% of that of control values. **Starches** from these low SBE activity plants showed increases of up to 5.degree.C in d.s.c. peak **temp**. and viscosity onset **temp**. Studies on melting of crystallites obtained from linear (1 .fwdarw. 4)-.alpha.-D-**glucan** oligomers suggest that an av. difference of double helix length of about one glucose residue might be sufficient to account for the obsd. differences in gelatinization properties. It is postulated that the modification of gelatinization properties at low SBE activities is due to a subtle alteration in **amylopectin** branch patterns resulting in small changes in double helix lengths within granules.

ST **potato starch** property branching enzyme antisense

IT **Potato (Solanum tuberosum)**
(transgenic; consequences of antisense RNA inhibition of **starch** branching enzyme activity on properties of **potato starch**)

IT 7723-14-0, Phosphorus, biological studies **9037-22-3, Amylopectin**
RL: BOC (Biological occurrence); BSU (Biological study, unclassified); BIOL (Biological study); OCCU (Occurrence)
(consequences of antisense RNA inhibition of **starch** branching enzyme activity on properties of **potato starch**)

IT **9005-25-8, Starch**, biological studies
RL: BOC (Biological occurrence); BSU (Biological study, unclassified); **PRP (Properties)**; BIOL (Biological study); OCCU (Occurrence)
(consequences of antisense RNA inhibition of **starch** branching enzyme activity on properties of **potato starch**)

IT **9001-97-2, Starch** branching enzyme
RL: BSU (Biological study, unclassified); BIOL (Biological study)
(consequences of antisense RNA inhibition of **starch** branching enzyme activity on properties of **potato starch**)

RE.CNT 38 THERE ARE 38 CITED REFERENCES AVAILABLE FOR THIS RECORD

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L49 ANSWER 15 OF 22 HCAPLUS COPYRIGHT 2003 ACS
AN 1998:324901 HCAPLUS
DN 129:37231
TI Cloning and sequence of **starch**-branching enzyme genes of cassava for improvements in or relating to **starch** content of plants
IN **Jobling, Stephen Alan**; Safford, Richard
PA National Starch and Chemical Investment Holding Corporation, USA; Jobling, Stephen Alan; Safford, Richard
SO PCT Int. Appl., 67 pp.
CODEN: PIXXD2
DT Patent
LA English
IC ICM C12N015-82
ICS C12N009-10; C12Q001-68; C12N001-21; C12N015-54; A01H005-00
CC 3-2 (Biochemical Genetics)
Section cross-reference(s): 7, 11
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE	
PI	WO 9820145	A2	19980514	WO 1997-GB3032	19971104	<--
	W: AU, BR, CA, JP, KR, US					
	RW: AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE					
	AU 9748747	A1	19980529	AU 1997-48747	19971104	<--
	AU 730900	B2	20010315			
	GB 2320716	A1	19980701	GB 1997-23142	19971104	<--
	GB 2320716	B2	20010620			
	EP 941352	A2	19990915	EP 1997-911332	19971104	<--
	R: AT, BE, DE, DK, ES, FR, GR, IT, NL, SE, PT, FI					
PRAI	GB 1996-23095	A	19961105	<--		
	WO 1997-GB3032	W	19971104	<--		

AB Disclosed is a nucleic acid sequence encoding a polypeptide having **starch** branching enzyme (SBE) activity, the encoded polypeptide comprising an effective portion of the amino acid sequence. The SBE is .alpha.-**glucan**-branching glycosyltransferase type II. The SBE is derived from cassava (Manihot esculenta), and can be cloned on plasmid vectors and expressed in Escherichia coli and plant hosts. Suitable plant hosts include cassava, banana, **potato**, pea, tomato, corn, wheat, barley, oat, sweet **potato**, or rice. Genetically engineered deletion mutant forms of SBE are also claimed.
ST **starch** branching enzyme gene sequence cloning; cassava **starch** branching enzyme gene cloning; **glucan** branching

glycosyltransferase gene cassava
IT Banana (Musa)
Barley
Corn
Genetic engineering
Molecular cloning
Oat
Pea
Potato (Solanum tuberosum)
Protein sequences
Rice (Oryza sativa)
Sweet **potato**
Tomato
Wheat
cDNA sequences
(cloning and sequence of **starch**-branching enzyme genes of cassava for improvements in or relating to **starch** content of plants)
IT Antisense RNA
RL: AGR (Agricultural use); BIOL (Biological study); USES (Uses)
(cloning and sequence of **starch**-branching enzyme genes of cassava for improvements in or relating to **starch** content of plants)
IT Gene
(expression, antisense inhibition; cloning and sequence of **starch**-branching enzyme genes of cassava for improvements in or relating to **starch** content of plants)
IT Gene, plant
RL: AGR (Agricultural use); BPR (Biological process); BSU (Biological study, unclassified); PRP (Properties); BIOL (Biological study); PROC (Process); USES (Uses)
(for **starch**-branching enzymes, of cassava; cloning and sequence of **starch**-branching enzyme genes of cassava for improvements in or relating to **starch** content of plants)
IT Cassava (Manihot esculenta)
(**starch**-branching enzymes from; cloning and sequence of **starch**-branching enzyme genes of cassava for improvements in or relating to **starch** content of plants)
IT 208408-78-0 208408-80-4
RL: BAC (Biological activity or effector, except adverse); BSU (Biological study, unclassified); PRP (Properties); BIOL (Biological study)
(amino acid sequence; cloning and sequence of **starch**-branching enzyme genes of cassava for improvements in or relating to **starch** content of plants)
IT **9005-25-8, Starch**, biological studies
RL: BPR (Biological process); BSU (Biological study, unclassified); BIOL (Biological study); PROC (Process)
(cloning and sequence of **starch**-branching enzyme genes of cassava for improvements in or relating to **starch** content of plants)
IT 208408-77-9 208408-79-1
RL: BPR (Biological process); BSU (Biological study, unclassified); PRP (Properties); BIOL (Biological study); PROC (Process)
(nucleotide sequence; cloning and sequence of **starch**-branching enzyme genes of cassava for improvements in or relating to **starch** content of plants)
IT **9001-97-2, Starch**-branching enzyme
RL: AGR (Agricultural use); FFD (Food or feed use); BIOL (Biological study); USES (Uses)
(type II; cloning and sequence of **starch**-branching enzyme genes of cassava for improvements in or relating to **starch** content of plants)

L49 ANSWER 16 OF 22 HCAPLUS COPYRIGHT 2003 ACS
AN 1997:111211 HCAPLUS
DN 126:117274
TI **Thermally**-inhibited pregelatinized non-granular **starches** and flours and process for their production
IN Jeffcoat, Roger; Chiu, Chung-Wai; Shah, Manish B.; Thomas, David J.; Hanchett, Douglas J.
PA National Starch and Chemical Investment Holding Co, USA
SO PCT Int. Appl., 38 pp.
CODEN: PIXXD2
DT Patent
LA English
IC ICM C08B030-14
ICS A23L001-0522
CC 17-11 (Food and Feed Chemistry)
FAN.CNT 12

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE	
PI	WO 9640794	A1	19961219	WO 1996-US7076	19960516	<--
	W: AL, AM, AT, AU, AZ, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI					
	RW: KE, LS, MW, SD, SZ, UG, AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, ML					
	US 5720822	A	19980224	US 1995-476963	19950607	<--
	CA 2221510	AA	19961219	CA 1996-2221510	19960516	<--
	AU 9658614	A1	19961230	AU 1996-58614	19960516	<--
	AU 700049	B2	19981217			
	EP 830379	A1	19980325	EP 1996-920247	19960516	<--
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI					
	JP 11506798	T2	19990615	JP 1996-500586	19960516	<--
	BR 9609095	A	20000328	BR 1996-9095	19960516	<--
	EP 1159880	A2	20011205	EP 2001-120646	19960516	<--
	EP 1159880	A3	20020102			
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI					
	US 6010574	A	20000104	US 1997-959087	19971028	<--
	US 6261376	B1	20010717	US 1999-436671	19991110	<--
PRAI	US 1995-476963	A	19950607	<--		
	EP 1996-920247	A3	19960516	<--		
	WO 1996-US7076	W	19960516	<--		
	US 1997-959087	A1	19971028	<--		

AB **Thermally**-inhibited, pregelatinized non-granular **starches** and flours are prepd. by pregelatinizing the **starch** or flour and **thermally** inhibiting the **starch** or flour by dehydrating the **starch** or flour to anhyd. or substantially anhyd. forms and then **heat**-treating the dehydrated **starch**. The pregelatinization may be carried out prior to or after the **thermal** inhibition using known methods which disrupt the granular structure such as by drum-drying or jet-cooking and spray-drying. Preferably the **starch** or flour is adjusted to a pH above 7.0 prior to the **thermal** inhibition. The **starch** may be dehydrated by **heating** the **starch** in a suitable **heating** app., by extg. the water from the **starch** using a solvent such as ethanol, or by **freeze** -drying the **starch**. Preferably the **starch** or flour is treated with a solvent to remove proteins and/or lipids and thus prevent off-flavors.

ST **starch** pregelatinized flour
IT Drying
(drum; **thermally**-inhibited pregelatinized non-granular

starches and flours)
IT Cooking
(extrusion; **thermally**-inhibited pregelatinized non-granular **starches** and flours)
IT Flavor
(off-flavor; **thermally**-inhibited pregelatinized non-granular **starches** and flours)
IT Drying
(spray; **thermally**-inhibited pregelatinized non-granular **starches** and flours)
IT Amaranthus
Banana (Musa)
Barley
Cassava (Manihot esculenta)
Corn
Flours and Meals
Food gelling
Food viscosity
Pea
Potato (Solanum tuberosum)
Rice (Oryza sativa)
Sago palm
Sorghum
Sweet **potato**
Wheat
(**thermally**-inhibited pregelatinized non-granular **starches** and flours)
IT 64-17-5, Ethanol, biological studies
RL: FFD (Food or feed use); BIOL (Biological study); USES (Uses)
(**thermally**-inhibited pregelatinized non-granular **starches** and flours)
IT **9005-25-8, Starch**, biological studies **9005-82-7**
, Amylose 9037-22-3, Waxy **starch**
RL: FFD (Food or feed use); PEP (Physical, engineering or chemical process); **PRP (Properties)**; BIOL (Biological study); PROC (Process); USES (Uses)
(**thermally**-inhibited pregelatinized non-granular **starches** and flours)
IT 10025-87-3, Phosphorus oxychloride
RL: PEP (Physical, engineering or chemical process); PROC (Process)
(**thermally**-inhibited pregelatinized non-granular **starches** and flours)

L49 ANSWER 17 OF 22 HCAPLUS COPYRIGHT 2003 ACS
AN 1997:12611 HCAPLUS
DN 126:44371
TI A class A **starch** branching enzyme gene from **potato** and its use in altering the properties of plant **starches**
IN Cooke, David; Debet, Martine; Gidley, Michael John; **Jobling, Stephen Alan**; Safford, Richard; Sidebottom, Christopher Michael; **Westcott, Roger John**
PA National Starch and Chemical Investment Holding Corp., USA; Cooke, David; Debet, Martine; Gidley, Michael John; Jobling, Stephen Alan; Safford, Richard; Sidebottom, Christopher Michael; Westcott, Roger John
SO PCT Int. Appl., 140 pp.
CODEN: PIXXD2
DT Patent
LA English
IC ICM C12N015-82
ICS C12N015-54; C08B030-04; A01H005-00
CC 7-2 (Enzymes)
Section cross-reference(s): 3, 11, 17, 44
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 9634968	A2	19961107	WO 1996-GB1075	19960503 <--
	WO 9634968	A3	19961205		
	W: AU, BR, CA, JP, KR, US				
	RW: AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE				
	CA 2217878	AA	19961107	CA 1996-2217878	19960503 <--
	AU 9655099	A1	19961121	AU 1996-55099	19960503 <--
	AU 706009	B2	19990603		
	EP 826061	A2	19980304	EP 1996-912161	19960503 <--
	R: AT, BE, DE, DK, ES, FR, GB, GR, IT, NL, SE, PT, FI				
PRAI	GB 1995-9229		19950505 <--		
	GB 1996-7409		19960410 <--		
	WO 1996-GB1075		19960503 <--		

AB A cDNA for a class A **starch** branching enzyme (SBE) of **potato** is cloned and characterized for expression in other plants to alter the properties of their **starches**. A cDNA was cloned by PCR using primers derived from conserved peptides of other SBEs. **Potato** plants transformed combinations of sense and antisense expression constructs for class A and B SBEs were pred. and the properties of their **starches** characterized. Plants carrying antisense DNA to class A and class B enzymes had **amylose** as the main constituent of their **starch**. The pasting onset **temps**. of their **starches** were increased by 25-30.degree.. Data from other transformants indicated that most of the effects were due to inhibition of class A gene expression.

ST **starch** branching enzyme cDNA **potato**; **amylose**
starch branching enzyme **potato**; **amylopectin**
starch branching enzyme **potato**

IT **Potato (Solanum tuberosum)**
(class A **starch** branching enzyme gene from **potato** and its use in altering properties of plant **starches**)

IT Gene, plant
RL: AGR (Agricultural use); BSU (Biological study, unclassified); PRP (Properties); BIOL (Biological study); USES (Uses)
(class A **starch** branching enzyme gene from **potato** and its use in altering properties of plant **starches**)

IT Barley
Cassava (Manihot esculenta)
Corn
Pea
Rice (Oryza sativa)
Sweet **potato**
Tomato
Wheat
(expression of **potato starch** branching enzyme DNA in; class A **starch** branching enzyme gene from **potato** and its use in altering properties of plant **starches**)

IT cDNA sequences
(for **starch** branching enzyme of **potato**; class A **starch** branching enzyme gene from **potato** and its use in altering properties of plant **starches**)

IT Genetic polymorphism
(in **starch** branching enzyme genes of **potato**; class A **starch** branching enzyme gene from **potato** and its use in altering properties of plant **starches**)

IT Protein sequences
(of **starch** branching enzyme of **potato**; class A **starch** branching enzyme gene from **potato** and its use in altering properties of plant **starches**)

IT Transit peptides
RL: BOC (Biological occurrence); BSU (Biological study, unclassified); BUU (Biological use, unclassified); PRP (Properties); BIOL (Biological study);

OCCU (Occurrence); USES (Uses)
(of **starch** branching enzyme of **potato**; class A **starch** branching enzyme gene from **potato** and its use in altering properties of plant **starches**)

IT Plasmids
(pSJ64, **potato starch** branching enzyme cDNA on, expression in transgenic **potato** of; class A **starch** branching enzyme gene from **potato** and its use in altering properties of plant **starches**)

IT Plasmids
(pSJ90, **potato starch** branching enzyme cDNA on, expression in Escherichia coli of; class A **starch** branching enzyme gene from **potato** and its use in altering properties of plant **starches**)

IT Genetic element
RL: BOC (Biological occurrence); BSU (Biological study, unclassified); BUU (Biological use, unclassified); PRP (Properties); BIOL (Biological study); OCCU (Occurrence); USES (Uses)
(signal sequence, of **starch** branching enzyme gene of **potato**; class A **starch** branching enzyme gene from **potato** and its use in altering properties of plant **starches**)

IT Coating materials
Dietary fiber
Gelation agents
(**starch** with altered compn. and properties for use as; class A **starch** branching enzyme gene from **potato** and its use in altering properties of plant **starches**)

IT Glass fibers, miscellaneous
RL: MSC (Miscellaneous)
(**starch** with altered compn. and properties for use in prepn. of; class A **starch** branching enzyme gene from **potato** and its use in altering properties of plant **starches**)

IT Adhesives
Films
Packaging materials
Textiles
(**starch** with altered compn. and properties for use in; class A **starch** branching enzyme gene from **potato** and its use in altering properties of plant **starches**)

IT Antisense DNA
RL: AGR (Agricultural use); BIOL (Biological study); USES (Uses)
(to **starch** branching enzyme of **potato**; class A **starch** branching enzyme gene from **potato** and its use in altering properties of plant **starches**)

IT **9005-25-8P, Starch**, properties
RL: **BPN (Biosynthetic preparation)**; **PRP (Properties)**; BIOL (Biological study); **PREP (Preparation)**
(alteration of properties of; class A **starch** branching enzyme gene from **potato** and its use in altering properties of plant **starches**)

IT 184855-10-5 184855-12-7 184855-20-7 184855-21-8
RL: AGR (Agricultural use); BUU (Biological use, unclassified); PRP (Properties); BIOL (Biological study); USES (Uses)
(amino acid sequence; class A **starch** branching enzyme gene from **potato** and its use in altering properties of plant **starches**)

IT 184855-11-6 184855-13-8 184855-14-9 184855-15-0 184855-16-1 184855-17-2 184855-18-3 184855-19-4
RL: AGR (Agricultural use); BUU (Biological use, unclassified); PRP (Properties); BIOL (Biological study); USES (Uses)
(nucleotide sequence; class A **starch** branching enzyme gene from **potato** and its use in altering properties of plant

starches)
IT **9001-97-2, Starch** branching enzyme
RL: AGR (Agricultural use); PRP (Properties); BIOL (Biological study); USES (Uses)
(**starch** branching enzyme gene from **potato** and its use in altering properties of plant **starches**)
IT **9005-82-7P, Amylose 9037-22-3P, Amylopectin** 14265-44-2P, Phosphate, properties
RL: BPN (Biosynthetic preparation); PRP (Properties); BIOL (Biological study); PREP (Preparation)
(**starch** with altered content of; class A **starch** branching enzyme gene from **potato** and its use in altering properties of plant **starches**)

L49 ANSWER 18 OF 22 HCAPLUS COPYRIGHT 2003 ACS
AN 1996:737319 HCAPLUS
DN 126:135547
TI A new generation of **starch** products as excipient in pharmaceutical tablets. II. High surface area retrograded pregelatinized **potato starch** products in sustained-release tablets
AU Te Wierik, G. Henk P.; Eissens, Anko C.; Bergsma, Jack; Arends-Scholte, A. Willemien; Lerk, Coenraad F.
CS Groningen Institute for Drug Studies (GIDS), Department of Pharmaceutical Technology and Biopharmacy, University of Groningen, Ant. Deusinglaan 1, AV Groningen, 9713, Neth.
SO Journal of Controlled Release (**1997**), 45(1), 25-33
CODEN: JCREEC; ISSN: 0168-3659
PB Elsevier
DT Journal
LA English
CC 63-6 (Pharmaceuticals)
AB A new linear short-chain **starch** product was prepd. by gelatinization of **potato starch** followed by enzymic degrdn., pptn. (retrogradation) and filtration. A high sp. surface area was subsequently created by washing with ethanol or acetone or **freeze**-drying. Tablets compressed from a mixt. contg. the **starch** product and 30% theophylline at a force of at least 15 kN showed no disintegration and an almost const. (zero-order) sustained drug release. The delivery from these non-porous tablets proved to be a swelling-controlled solvent-activated mechanism, as was confirmed by the slow penetration of a solvent front into the tablet. Drug release was not affected by the incorporation of magnesium stearate into the tablet or the presence of .alpha.-amylase in the dissoln. medium, both features in contrast to similar tablets compressed from conventional pregelatinized **starches**, which were prepd. by gelatinization followed directly by **thermal** dehydration. A sp. surface area of 1.5 m2/g proved to be a prerequisite for the **starch** product to control drug release. A high surface area (linear long-chain) **amylose** product showed a sustained but less linear release profile. Branched short and long-chain products with a high surface area produced disintegrating tablets and are therefore not able to control drug release.
ST surface area pregelatinized **potato starch** tablet; sustained release tablet **starch** surface area
IT Dissolution rate
Surface area
(pregelatinized **potato starch** products in sustained-release tablets)
IT Drug delivery systems
(tablets, sustained-release; pregelatinized **potato starch** products in sustained-release tablets)
IT **9005-82-7, Amylose 9037-22-3, Amylopectin**
RL: PEP (Physical, engineering or chemical process); PROC (Process)

(pregelatinized **potato starch** products in sustained-release tablets)

IT **9005-25-8, Starch**, biological studies
RL: **PRP (Properties)**; THU (Therapeutic use); BIOL (Biological study); USES (Uses)
(pregelatinized **potato starch** products in sustained-release tablets)

IT 58-55-9, Theophylline, biological studies 557-04-0, Magnesium stearate
RL: THU (Therapeutic use); BIOL (Biological study); USES (Uses)
(pregelatinized **potato starch** products in sustained-release tablets)

L49 ANSWER 19 OF 22 HCAPLUS COPYRIGHT 2003 ACS
AN 1995:986444 HCAPLUS
DN 124:11302
TI Method for producing altered **starch** from **potato** plants
IN Cooke, David; Gidley, Michael John; **Jobling, Stephen Alan**; Safford, Richard; Sidebottom, Christopher Michael; **Westcott, Roger John**
PA National Starch and Chemical Investment Holding Corp., USA
SO PCT Int. Appl., 36 pp.
CODEN: PIXXD2
DT Patent
LA English
IC ICM C12N015-82
ICS C12N015-11; A01H005-00; C08B030-14
CC 44-6 (Industrial Carbohydrates)
Section cross-reference(s): 3, 7, 11, 17
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 9526407	A1	19951005	WO 1995-GB634	19950322 <--
	W: AM, AT, AU, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, ES, FI, GB, GE, HU, JP, KE, KG, KP, KR, KZ, LK, LT, LU, LV, MD, MG, MN, MW, NL, NO, NZ, PL, PT, RO, RU, SD, SE, SI, SK, TJ, TT, UA, US, UZ, VN				
	RW: KE, MW, SD, SZ, UG, AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG				
	CA 2186399	AA	19951005	CA 1995-2186399	19950322 <--
	CA 2186399	C	20010904		
	AU 9519028	A1	19951017	AU 1995-19028	19950322 <--
	AU 688006	B2	19980305		
	EP 754235	A1	19970122	EP 1995-911460	19950322 <--
	R: AT, BE, DE, ES, FR, GB, IT, NL, SE				
	US 6103893	A	20000815	US 1996-716449	19960924 <--
PRAI	GB 1994-6022	A	19940325 <--		
	EP 1994-305806	A	19940804 <--		
	EP 1995-300210	A	19950113 <--		
	WO 1995-GB634	W	19950322 <--		

AB Disclosed is a method of producing altered **starch** from transformed **potato** plants or their progeny, comprising extg. **starch** from a **potato** plant, at least the **tubers** of which comprise at least an effective portion of a **starch** branching enzyme (SBE) cDNA sequence operably linked in the antisense orientation to a suitable promoter, such that the level of SBE activity is limited to less than 0.8 units per g **tuber**. Also disclosed are **potato** plants comprising altered **starch** in accordance with the invention.

ST **starch** altered prodn **potato** transgenosis; enzyme **starch** branching cDNA sequence **potato**

IT Gelation
Tuber (plant organ)
(method for producing altered **starch** from transgenic

potato plants using **starch** branching enzyme regulation)
IT Virus, plant
(cauliflower mosaic, method for producing altered **starch** from transgenic **potato** plants using **starch** branching enzyme regulation)
IT Deoxyribonucleic acid sequences
(complementary, method for producing altered **starch** from transgenic **potato** plants using **starch** branching enzyme regulation)
IT Glycoproteins, specific or class
RL: BSU (Biological study, unclassified); BIOL (Biological study)
(patatins, method for producing altered **starch** from transgenic **potato** plants using **starch** branching enzyme regulation)
IT Genetic element
RL: BUU (Biological use, unclassified); FFD (Food or feed use); BIOL (Biological study); USES (Uses)
(promoter, method for producing altered **starch** from transgenic **potato** plants using **starch** branching enzyme regulation)
IT Transformation, genetic
(transgenic, method for producing altered **starch** from transgenic **potato** plants using **starch** branching enzyme regulation)
IT **9030-10-8, Starch** synthase
RL: BSU (Biological study, unclassified); BIOL (Biological study)
(granule-bound; method for producing altered **starch** from transgenic **potato** plants using **starch** branching enzyme regulation)
IT **9005-25-8DP, Starch**, altered derivs.
RL: **BMF (Bioindustrial manufacture)**; FFD (Food or feed use); **PUR (Purification or recovery)**; BIOL (Biological study); **PREP (Preparation)**; USES (Uses)
(method for producing altered **starch** from transgenic **potato** plants using **starch** branching enzyme regulation)
IT **9001-97-2P, Starch** branching enzyme
RL: BPN (Biosynthetic preparation); BUU (Biological use, unclassified); FFD (Food or feed use); BIOL (Biological study); PREP (Preparation); USES (Uses)
(method for producing altered **starch** from transgenic **potato** plants using **starch** branching enzyme regulation)
IT 171545-22-5
RL: BPR (Biological process); BSU (Biological study, unclassified); BUU (Biological use, unclassified); FFD (Food or feed use); PRP (Properties); BIOL (Biological study); PROC (Process); USES (Uses)
(method for producing altered **starch** from transgenic **potato** plants using **starch** branching enzyme regulation)

L49 ANSWER 20 OF 22 HCAPLUS COPYRIGHT 2003 ACS
AN 1993:537770 HCAPLUS
DN 119:137770
TI **Thermal** behavior of **potato amylose** and enzyme-resistant **starch** from maize
AU Sievert, D.; Wuersch, P.
CS Nestle Res. Cent., Lausanne, 1000, Switz.
SO Cereal Chemistry (**1993**), 70(3), 333-8
CODEN: CECHAF; ISSN: 0009-0352
DT Journal
LA English

CC 17-2 (Food and Feed Chemistry)
AB The **thermal** properties of **potato amylose** (d.p. 5500) and of enzyme-resistant **starch** (RS) (d.p. 65) from autoclaved maize **starch** in a concd. aq. system (22%, wt./wt.) were studied by differential scanning calorimetry (DSC). **Heating** of **amylose** and RS in the DSC instrument to 180.degree.(**heating** rate 5.degree./min) gave melting transitions at 153.6 and 139.8.degree., resp., indicating disordering of fairly thermostable regions. This **heating** to high **temps.** was accompanied by a partial **thermal** degrdn. of the linear **amylose** and RS chains. Reappearance of endotherms during repeated **heating** and the appearance of exotherms during each **cooling** phase suggested (re)assocn. of chains from the polymer melts of both **amylose** and RS. Assocn. of **amylose** and RS chains appeared to start between 80-75.degree. and 60-55.degree., resp. Whereas interactions between the long **amylose** chains were reduced at **cooling** rates of >10.degree./min, interchain contacts between the shorter RS chains seemed not to be affected by the rate of **cooling** . In the presence of the complexing agent L-.alpha.-lysophosphatidylcholine (LPC), the process of assocn. of linear chains was competitively affected by the formation of inclusion complexes of the linear chains with LPC. At an LPC concn. of 10% (wt./wt.), complex formation dominated, and no assocn. of **amylose** or RS chains was obsd.
ST **potato amylose thermal** behavior; corn **starch** enzyme resistant **thermal** behavior; **thermal** behavior **potato amylose** corn **starch**
IT **Potato**
(**amylose** of, **thermal** behavior of)
IT **Thermal** property
(of **potato amylose** and enzyme-resistant corn **starch**)
IT **Heat** of fusion and **Heat** of **freezing**
(of **potato amylose** and enzyme-resistant corn **starch**, factors affecting)
IT Lysophosphatidylcholines
RL: BIOL (Biological study)
(**thermal** behavior of **potato amylose** and enzyme-resistant corn **starch** response to complexing with)
IT **9005-82-7, Amylose**
RL: PROC (Process)
(of **potato, thermal** behavior of)
IT **9005-25-8, Starch**, properties
RL: **PRP (Properties)**
(**thermal** behavior of corn enzyme-resistant)

L49 ANSWER 21 OF 22 HCAPLUS COPYRIGHT 2003 ACS
AN 1984:87607 HCAPLUS
DN 100:87607
TI Reactivity of **amylose** and **amylopectin** in **potato starch**
AU Steeneken, P. A. M.
CS Potato Proc. Res. Inst., TNO, Groningen, 9723 CC, Neth.
SO Starch/Staerke (**1984**), 36(1), 13-18
CODEN: STARDD; ISSN: 0038-9056
DT Journal
LA English
CC 44-6 (Industrial Carbohydrates)
AB The reactivity of amylase(I) and **amylopectin**(II) in **potato starch** (III) to (diethylamino)ethyl chloride (IV) was investigated by etherifying III with IV to a low substitution degree (SD) and detg. the distribution of ether groups on I and II. At almost

equal SD, the I in granular III showed higher reactivity than in soln. in comparison to II, indicating that there is a difference in phys. state between I and II in granular III. The relative reactivity of I and II can be varied by the modification of native III, such as milling, **freeze-thaw** and **heat**-moisture treatment and chems.-activation.

ST diethylaminoethyl amylase formation reactivity **starch**; **amylopectin** diethylaminoethyl formation reactivity **starch**

IT **9005-25-8**, properties
RL: **PRP (Properties)**
((diethylamino)ethyl **amylose** and **amylopectin** formation in, reactivity in relation to)

IT 58834-27-8P 88922-68-3P
RL: BYP (Byproduct); PREP (Preparation)
(formation of, in **starch**, reactivity in relation to)

IT 56-81-5, uses and miscellaneous 110-86-1, uses and miscellaneous 7732-18-5, uses and miscellaneous
RL: USES (Uses)
(**starch** treated with, (diethylamino)ethyl **amylose** and **amylopectin** formation in, reactivity in relation to)

L49 ANSWER 22 OF 22 HCAPLUS COPYRIGHT 2003 ACS
AN 1971:539462 HCAPLUS
DN 75:139462
TI Examination on the influence of **freeze**-drying on crystalline **starch** structure by x-ray diffractometry
AU Robin, J. P.; Duprat, F.; Charbonniere, R.; Guilbot, A.
CS Inst. Natl. Rech. Agron., Massy, Fr.
SO Staerke (**1971**), 23(9), 320-5
CODEN: STRKA6; ISSN: 0038-9056
DT Journal
LA French
CC 17 (Foods)
AB The influence of **freeze**-drying on the cryst. structure of various **starches** (**potato**, wheat, maize, waxy maize, manioc, arrowroot) and wheat **amylose** was examd. by means of x-ray diffractometric diagrams. Only the cryst. structure of **potato starch** is altered by the treatment. A change in structure becomes apparent only if **freeze**-drying is done slowly and if the water content of **starch** is above 25%, related to dry substance. However, a restoration of the original structure of **starch** is possible, by mositening under certain conditions. An explanation for the observations is proposed by means of a new hypothesis on structure organization of **starch** granules as well as the role of water as a detg. factor for organization.

ST **starch** structure **freeze** drying

IT Drying
(**freeze-**, of **starch**, cryst. structure in relation to)

IT **9005-25-8**, properties
RL: **PRP (Properties)**
(cryst. structure of, **freeze**-drying effect on)

=> fil reg
FILE 'REGISTRY' ENTERED AT 11:01:05 ON 25 APR 2003
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Property values tagged with IC are from the ZIC/VINITI data file provided by InfoChem.

STRUCTURE FILE UPDATES: 23 APR 2003 HIGHEST RN 504385-01-7
DICTIONARY FILE UPDATES: 23 APR 2003 HIGHEST RN 504385-01-7

TSCA INFORMATION NOW CURRENT THROUGH JANUARY 6, 2003

Please note that search-term pricing does apply when conducting SmartSELECT searches.

Crossover limits have been increased. See HELP CROSSOVER for details.

Experimental and calculated property data are now available. See HELP PROPERTIES for more information. See STNote 27, Searching Properties in the CAS Registry File, for complete details:
http://www.cas.org/ONLINE/STN/STNOTES/stnotes27.pdf

=> d ide can tot

L50 ANSWER 1 OF 8 REGISTRY COPYRIGHT 2003 ACS
RN **330869-84-6** REGISTRY
CN Glucosyltransferase, adenosine diphosphoglucose-starch (Solanum tuberosum strain AM79.7322 gene amf) (9CI) (CA INDEX NAME)
FS PROTEIN SEQUENCE
MF Unspecified
CI MAN
SR CA
LC STN Files: CA, CAPLUS

RELATED SEQUENCES AVAILABLE WITH SEQLINK

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
*** USE 'SQD' OR 'SQIDE' FORMATS TO DISPLAY SEQUENCE ***
1 REFERENCES IN FILE CA (1962 TO DATE)
1 REFERENCES IN FILE CAPLUS (1962 TO DATE)

REFERENCE 1: 134:249650

L50 ANSWER 2 OF 8 REGISTRY COPYRIGHT 2003 ACS
RN **9075-68-7** REGISTRY
CN Pullulanase (9CI) (CA INDEX NAME)
OTHER NAMES:
CN .alpha.-Dextrin 6-glucanohydrolase
CN Amylo-1,6-.alpha.-glucosidase
CN Amylopectin 6-glucanohydrolase
CN Amylopectin-1,6-.beta.-glucohydrolase
CN Amylux S
CN Debranching enzyme
CN E.C. 3.2.1.41
CN E.C. 3.2.1.69
CN Glucanohydrolase, amylopectin 6-
CN Glucoamylase P
CN Limit dextrinase
CN Optimax 300L
CN Plunaz
CN Promozyme
CN Promozyme 200L
CN Promozyme 460
CN R-enzyme
CN Starch debranching enzyme
DR 9059-05-6
MF Unspecified
CI MAN
LC STN Files: AGRICOLA, ANABSTR, BIOBUSINESS, BIOSIS, BIOTECHNO, CA, CAPLUS, CASREACT, CBNB, CHEMCATS, CHEMLIST, CIN, CSCHEM, EMBASE, IFICDB,

IFIPAT, IFIUDB, PIRA, PROMT, TOXCENTER, USPAT2, USPATFULL
Other Sources: DSL**, EINECS**, TSCA**
(**Enter CHEMLIST File for up-to-date regulatory information)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
1057 REFERENCES IN FILE CA (1962 TO DATE)
12 REFERENCES TO NON-SPECIFIC DERIVATIVES IN FILE CA
1058 REFERENCES IN FILE CAPLUS (1962 TO DATE)

REFERENCE 1: 138:270339

REFERENCE 2: 138:267698

REFERENCE 3: 138:237261

REFERENCE 4: 138:237258

REFERENCE 5: 138:169139

REFERENCE 6: 138:133148

REFERENCE 7: 138:105713

REFERENCE 8: 138:85532

REFERENCE 9: 138:75013

REFERENCE 10: 138:75005

L50 ANSWER 3 OF 8 REGISTRY COPYRIGHT 2003 ACS
RN **9037-22-3** REGISTRY
CN Amylopectin (9CI) (CA INDEX NAME)
OTHER NAMES:
CN Amaizo 839
CN Amioca
CN Amioca WCS
CN C*Pharm 12018
CN Cato 225
CN Cato 240
CN Cato 270
CN Cerestar SF 04201
CN Farinex WM 85
CN Film Kote 54
CN Honen Alpha Waxy Starch
CN Kosol
CN Pectin, amylo
CN Starch, waxy
CN Ultraamylopectin N
CN Ultrasperse A
CN Waxy 7350
CN Waxy Alpha Y
CN Waxy corn starch
CN Waxy maize starch
CN Waxy starch
CN WCS
DR 9050-86-6, 189047-96-9
MF Unspecified
CI PMS, COM, MAN
PCT Manual registration, Polyother, Polyother only
LC STN Files: AGRICOLA, ANABSTR, BIOBUSINESS, BIOSIS, BIOTECHNO, CA, CABA, CANCERLIT, CAPLUS, CASREACT, CBNB, CEN, CHEMCATS, CHEMLIST, CIN, CSCHEM, DDFU, DRUGU, EMBASE, IFICDB, IFIPAT, IFIUDB, IPA, MEDLINE, MRCK*, NAPRALERT, PIRA, PROMT, TOXCENTER, TULSA, USPAT2, USPATFULL

(*File contains numerically searchable property data)
Other Sources: DSL**, EINECS**, TSCA**
(**Enter CHEMLIST File for up-to-date regulatory information)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
2780 REFERENCES IN FILE CA (1962 TO DATE)
201 REFERENCES TO NON-SPECIFIC DERIVATIVES IN FILE CA
2785 REFERENCES IN FILE CAPLUS (1962 TO DATE)

REFERENCE 1: 138:276257

REFERENCE 2: 138:276256

REFERENCE 3: 138:276255

REFERENCE 4: 138:270689

REFERENCE 5: 138:270614

REFERENCE 6: 138:268469

REFERENCE 7: 138:268332

REFERENCE 8: 138:260453

REFERENCE 9: 138:254159

REFERENCE 10: 138:254154

L50 ANSWER 4 OF 8 REGISTRY COPYRIGHT 2003 ACS
RN **9030-10-8** REGISTRY
CN Glucosyltransferase, adenosine diphosphoglucose-starch (9CI) (CA INDEX NAME)
OTHER NAMES:
CN Adenosine diphosphate glucose-starch glucosyltransferase
CN Adenosine diphosphoglucose-starch glucosyltransferase
CN ADP-glucose starch synthase
CN ADP-glucose transglucosylase
CN ADP-glucose-starch glucosyltransferase
CN E.C. 2.4.1.21
CN Starch (bacterial glycogen) synthase
CN Starch synthase
CN Starch synthetase
MF Unspecified
CI MAN
LC STN Files: AGRICOLA, BIOBUSINESS, BIOSIS, CA, CAPLUS, CEN, CIN, NAPRALERT, PROMT, TOXCENTER, USPATFULL

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
487 REFERENCES IN FILE CA (1962 TO DATE)
4 REFERENCES TO NON-SPECIFIC DERIVATIVES IN FILE CA
488 REFERENCES IN FILE CAPLUS (1962 TO DATE)

REFERENCE 1: 138:268499

REFERENCE 2: 138:251535

REFERENCE 3: 138:249919

REFERENCE 4: 138:239617

REFERENCE 5: 138:218282

REFERENCE 6: 138:184101

REFERENCE 7: 138:133909

REFERENCE 8: 138:105934

REFERENCE 9: 138:101981

REFERENCE 10: 138:50806

L50 ANSWER 5 OF 8 REGISTRY COPYRIGHT 2003 ACS
RN **9012-72-0** REGISTRY
CN D-Glucan (9CI) (CA INDEX NAME)
OTHER NAMES:
CN D-Glucosan
CN Glucan
CN Glucosan
CN Poly-D-glucan
CN Polyglucan
CN Polyglucosan
DR 9037-91-6, 9072-21-3
MF Unspecified
CI PMS, COM, MAN
PCT Manual registration
LC STN Files: ADISNEWS, AGRICOLA, ANABSTR, BIOBUSINESS, BIOSIS, BIOTECHNO, CA, CANCERLIT, CAPLUS, CHEMCATS, CHEMLIST, CIN, CSCHEM, DDFU, DRUGU, EMBASE, IFICDB, IFIPAT, IFIUDB, IPA, MEDLINE, NAPRALERT, NIOSHTIC, PIRA, PROMT, RTECS*, TOXCENTER, USPAT2, USPATFULL
(*File contains numerically searchable property data)
Other Sources: EINECS**, NDSL**
(**Enter CHEMLIST File for up-to-date regulatory information)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
1965 REFERENCES IN FILE CA (1962 TO DATE)
142 REFERENCES TO NON-SPECIFIC DERIVATIVES IN FILE CA
1967 REFERENCES IN FILE CAPLUS (1962 TO DATE)

REFERENCE 1: 138:250539

REFERENCE 2: 138:226465

REFERENCE 3: 138:217454

REFERENCE 4: 138:206663

REFERENCE 5: 138:200967

REFERENCE 6: 138:172320

REFERENCE 7: 138:168888

REFERENCE 8: 138:152584

REFERENCE 9: 138:138969

REFERENCE 10: 138:126955

L50 ANSWER 6 OF 8 REGISTRY COPYRIGHT 2003 ACS
RN **9005-82-7** REGISTRY
CN Amylose (8CI, 9CI) (CA INDEX NAME)
OTHER NAMES:
CN .alpha.-Amylose
CN Amylose EX 1

CN AS 10
CN AS 110
CN AS 30
CN AS 30 (carbohydrate)
CN AS 320
CN AS 5
CN AS 70
CN EX-I
CN Polyamylose
CN San Super 240L
CN V Amylose
DR 9051-21-2, 9060-22-4, 37243-82-6
MF Unspecified
CI PMS, COM, MAN
PCT Manual registration, Polyother, Polyother only
LC STN Files: AGRICOLA, ANABSTR, BIOBUSINESS, BIOSIS, BIOTECHNO, CA, CABA, CANCERLIT, CAPLUS, CASREACT, CBNB, CEN, CHEMCATS, CHEMLIST, CIN, CSCHEM, DIOGENES, EMBASE, IFICDB, IFIPAT, IFIUDB, IPA, MEDLINE, MSDS-OHS, NAPRALERT, PIRA, PROMT, TOXCENTER, USPAT2, USPATFULL, VTB
Other Sources: EINECS**, NDSL**, TSCA**
(**Enter CHEMLIST File for up-to-date regulatory information)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
4682 REFERENCES IN FILE CA (1962 TO DATE)
447 REFERENCES TO NON-SPECIFIC DERIVATIVES IN FILE CA
4687 REFERENCES IN FILE CAPLUS (1962 TO DATE)

REFERENCE 1: 138:276329

REFERENCE 2: 138:276257

REFERENCE 3: 138:276256

REFERENCE 4: 138:276255

REFERENCE 5: 138:270614

REFERENCE 6: 138:270505

REFERENCE 7: 138:254160

REFERENCE 8: 138:254138

REFERENCE 9: 138:251496

REFERENCE 10: 138:251081

L50 ANSWER 7 OF 8 REGISTRY COPYRIGHT 2003 ACS
RN **9005-25-8** REGISTRY
CN Starch (8CI, 9CI) (CA INDEX NAME)
OTHER NAMES:
CN .alpha.-Starch
CN Absorbo HP
CN Ace P 320
CN Actobody TP 2
CN Aeromyl 115
CN Agglofroid 009
CN Agglofroid 313E
CN Allbond 200
CN Alphajel KS 37
CN Alstar B
CN Amaizo 100
CN Amaizo 213

CN Amaizo 310
CN Amaizo 5
CN Amaizo 71
CN Amaizo 710
CN Amaizo W 13
CN Amalean I-A 2131
CN Amalean I-A 7081
CN Amicoa
CN Amidex 3005
CN Amidex 4001
CN Amido-STA 1500
CN Amigel
CN Amigel 12014
CN Amigel 30076
CN Amijel VA 160
CN Amilys 100
CN Amycol HF
CN Amycol W
CN Amylogum
CN Amylomaize starch
CN Amylomaize VII
CN Amylon 70
CN Amylose, mixt. with amylopectin
CN Amylox 1
CN Amylum
CN Amyren 14
CN Amyren 71
CN Amysil K
CN Amyzet TK
CN Argo Corn Starch
CN Arrowroot starch
CN AS 225
CN AS 225 (starch)
CN Atomyl
CN Aytex P
CN B 200
CN B 200 (polysaccharide)
CN Bakeup YT 10
ADDITIONAL NAMES NOT AVAILABLE IN THIS FORMAT - Use FCN, FIDE, or ALL for DISPLAY
DEF A high-polymeric carbohydrate material primarily composed of amylopectin and amylose. It is usually derived from cereal grains such as corn, wheat and sorghum, and from roots and tubers such as potatoes and tapioca. It includes starch which has been pregelatinized by heating in the presence of water.
DR 9057-05-0, 53262-79-6, 131800-97-0, 60496-95-9, 67674-80-0, 75138-75-9, 75398-82-2, 154636-77-8, 152987-55-8, 85746-25-4, 42616-76-2, 53112-52-0
MF Unspecified
CI COM, MAN
LC STN Files: ADISNEWS, AGRICOLA, ANABSTR, AQUIRE, BIOBUSINESS, BIOSIS, BIOTECHNO, CA, CABA, CANCERLIT, CAPLUS, CASREACT, CBNB, CEN, CHEMCATS, CHEMLIST, CIN, CSCHEM, CSNB, DDFU, DRUGU, EMBASE, IFICDB, IFIPAT, IFIUDB, IPA, MEDLINE, MSDS-OHS, NAPRALERT, NIOSHTIC, PDLCOM*, PIRA, PROMT, RTECS*, TOXCENTER, USAN, USPAT2, USPATFULL, VTB
(*File contains numerically searchable property data)
Other Sources: DSL**, EINECS**, TSCA**
(**Enter CHEMLIST File for up-to-date regulatory information)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
56877 REFERENCES IN FILE CA (1962 TO DATE)
6140 REFERENCES TO NON-SPECIFIC DERIVATIVES IN FILE CA
56940 REFERENCES IN FILE CAPLUS (1962 TO DATE)

REFERENCE 1: 138:276329

REFERENCE 2: 138:276312

REFERENCE 3: 138:276304

REFERENCE 4: 138:276280

REFERENCE 5: 138:276277

REFERENCE 6: 138:276262

REFERENCE 7: 138:276257

REFERENCE 8: 138:276256

REFERENCE 9: 138:276255

REFERENCE 10: 138:276237

L50 ANSWER 8 OF 8 REGISTRY COPYRIGHT 2003 ACS
RN **9001-97-2** REGISTRY
CN Glycosyltransferase, .alpha.-glucan-branching (9CI) (CA INDEX NAME)
OTHER NAMES:
CN .alpha.-Glucan-branching glycosyltransferase
CN 1,4-.alpha.-Glucan branching enzyme
CN Amylose isomerase
CN Branching enzyme
CN Branching factor, enzymic
CN Branching glycosyltransferase
CN E.C. 2.4.1.18
CN Enzyme Q
CN Glucosan transglycosylase
CN Glycogen branching enzyme
CN Plant branching enzyme
CN Q-Enzyme
CN Starch-branching enzyme
MF Unspecified
CI MAN
LC STN Files: AGRICOLA, ANABSTR, BIOBUSINESS, BIOSIS, BIOTECHNO, CA, CAPLUS, CEN, CHEMINFORMRX, CIN, EMBASE, MRCK*, PIRA, TOXCENTER, USPAT2, USPATFULL
(*File contains numerically searchable property data)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
497 REFERENCES IN FILE CA (1962 TO DATE)
2 REFERENCES TO NON-SPECIFIC DERIVATIVES IN FILE CA
500 REFERENCES IN FILE CAPLUS (1962 TO DATE)

REFERENCE 1: 138:268499

REFERENCE 2: 138:251535

REFERENCE 3: 138:249919

REFERENCE 4: 138:185347

REFERENCE 5: 138:182934

REFERENCE 6: 138:150018

REFERENCE 7: 138:135195

REFERENCE 8: 138:118540

REFERENCE 9: 138:118539

REFERENCE 10: 138:102870

=> fil wpix
FILE 'WPIX' ENTERED AT 11:20:50 ON 25 APR 2003
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FILE LAST UPDATED: 10 APR 2003 <20030410/UP>
MOST RECENT DERWENT UPDATE: 200324 <200324/DW>
DERWENT WORLD PATENTS INDEX SUBSCRIBER FILE, COVERS 1963 TO DATE

Due to data production problems the WPI file had to be reset to update 200324. SDIs for update 24 will be rerun. The previous SDI run for 24 has been credited. Also answer sets created after April 10 may at least temporarily be affected and hence partially invalid.

>>> NEW WEEKLY SDI FREQUENCY AVAILABLE --> see NEWS <<<

>>> SLART (Simultaneous Left and Right Truncation) is now available in the /ABEX field. An additional search field /BIX is also provided which comprises both /BI and /ABEX <<<

>>> PATENT IMAGES AVAILABLE FOR PRINT AND DISPLAY <<<

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>>> FOR INFORMATION ON ALL DERWENT WORLD PATENTS INDEX USER GUIDES, PLEASE VISIT: http://www.derwent.com/userguides/dwpi_guide.html <<<

=> d all abeq tech abex tot l78

L78 ANSWER 1 OF 18 WPIX (C) 2003 THOMSON DERWENT
AN **2002-579390** [62] WPIX
DNC **C2002-163914**
TI **Freeze thawing** solution separation method for foodstuff solution, involves carrying out change of concentration of stratified formation ice, by physical effect of gravity, centrifugal force or pressing.
DC D13 D17
PA (KANS-N) KANSHO RIYO GIJUTSU KENKYUSHO KK
CYC 1
PI JP 2002153859 A 20020528 (200262)* 9p C02F001-22
ADT JP 2002153859 A JP 2000-352161 20001120
PRAI JP 2000-352161 20001120
IC ICM C02F001-22
ICS B01J019-00; C02F011-20
ICA A23L003-365
AB JP2002153859 A UPAB: 20020926
NOVELTY - A stratified formation ice has a gradient property in solute concentration obtained by advanced **freezing** of original solution. The change in concentration of stratified formation ice is done

by physical effect of gravity, centrifugal force or pressing to reduce the solute concentration of residual ice. The separation process is divided to multistage separation of fusion liquid.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are included for the following:

(1) Solid liquid separation method which involves **freezing** of suspension solution of suspended solid, by advanced **freezing** process. The fused fusion solution is filtered by the filter medium; and

(2) **Freeze thawing** separation apparatus includes stock solution filled for concentration. The erection inner tube (11) takes the ice in circulating state from the lower portion. The condensed portion consists of outer tube (12) forming concentration stock solution in an inner tube inducing advance **freezing**. A stock solution tank, concentration liquid feed zone and vertical double pipe-type concentrator (10) are provided in the apparatus. The erection tube is cooled by the coolant for **freezing**, and fusion container with filter medium is provided from advance **freezing** condensation portion.

USE - The **freeze thawing** solution is used for foodstuff and pharmaceutical using a **freezing** and **thawing** method, such as for root vegetable and corns, sweet **potato** in the food industry.

ADVANTAGE - This method promotes zero emission effectively and improves concentration efficiency and **freezing** efficiency. It also reduces the cost of waste liquid disposal and effective usage of resources.

DESCRIPTION OF DRAWING(S) - The figure shows the outline **freeze thawing** separation apparatus. (Drawing includes non-English language text).

Concentrator 10
Inner tube 11
Outer tube 12
Dwg.1/8

FS CPI
FA AB; GI
MC CPI: D03-H02A; **D06-H01**

L78 ANSWER 2 OF 18 WPIX (C) 2003 THOMSON DERWENT
AN **2002-395367** [43] WPIX
DNC **C2002-111427**
TI Process for preparing **starch** product with high resistance to enzymolysis.
DC A11
IN CHEN, L; WEN, Q
PA (UYHU-N) UNIV HUANAN SCI & ENG
CYC 1
PI CN 1334273 A 20020206 (200243)* C08B030-00 <--
ADT CN 1334273 A CN 2001-127741 20010816
PRAI CN 2001-127741 20010816
IC ICM **C08B030-00**
ICS A23L001-0522
AB CN 1334273 A UPAB: 20020709
NOVELTY - A **starch** product with high resistance to enzymolysis is prepared from beans, grains, **potato starch**, or higher straight-chain corn **starch** through mixing **starch** with water, stirring, regulating pH value, spray heating for gelation, maintaining a certain temperature for a certain time, loading in reactor, cooling, regulating pH value again, adding pullulan enzyme, cutting reaction, microwave heating, condensing, **freezing**, **thawing**, flocculating, and suction filtering or centrifugal filtering. Its advantages are widely available raw materials, low cost, simple process and high content of the **starch** with high resistance to enzymolysis.

Dwg.0/0
FS CPI
FA AB
MC CPI: A03-A; A10-G01B

L78 ANSWER 3 OF 18 WPIX (C) 2003 THOMSON DERWENT
AN **2001-257879** [26] WPIX
DNC **C2001-077719**
TI **Potato starch** stable against **freeze-thaw** cycles in native form, useful e.g. as thickener for foods, produced from transgenic plants in which **starch** synthase enzymes are inhibited.
DC C06 D16 D17
IN **JOBLING, S A; SCHWALL, G P; WESTCOTT, R J**
PA (NATT) NAT STARCH & CHEM INVESTMENT HOLDING COR
CYC 95
PI WO 2001019975 A2 20010322 (200126)* EN 76p C12N015-00 <--
RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ NL OA PT SD SE SL SZ TZ UG ZW
W: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CR CU CZ DE DK DM DZ EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT TZ UA UG US UZ VN YU ZA ZW
AU 2000070310 A 20010417 (200140) C12N015-00 <--
EP 1212440 A2 20020612 (200239) EN C12N015-82 <--
R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI
JP 2003509047 W 20030311 (200319) 122p C12N015-09 <--
ADT WO 2001019975 A2 **WO 2000-GB3522 20000913**; AU 2000070310 A AU 2000-70310 20000913; EP 1212440 A2 EP 2000-958901 20000913, **WO 2000-GB3522 20000913**; JP 2003509047 W **WO 2000-GB3522 20000913**, JP 2001-523747 20000913
FDT AU 2000070310 A Based on WO 200119975; EP 1212440 A2 Based on WO 200119975; JP 2003509047 W Based on WO 200119975
PRAI **GB 1999-21830 19990915**
IC ICM **C12N015-00**; **C12N015-09**; **C12N015-82**
ICS A01H005-00; A23L001-05; **C08B030-00**; **C08B030-02**; **C08B030-12**; **C12N005-10**; **C12N009-10**
AB WO 200119975 A UPAB: 20010515
NOVELTY - **Potato starch** (I), in native form as extracted, has **freeze-thaw** stability such that a 1 %weight/volume aqueous suspension has an absorbance at 700 nm less than 1.2 unit after 4 cycles of **freezing** overnight at -70 deg. C and **thawing** at room temperature for 2 hr, and 0.9, 0.7 or 0.5 units after, respectively, 3, 2 and 1 such cycles.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the following:

(a) plant cell containing nucleic acid sequences (I) that specifically inhibit granule-bound **starch** synthase I (GBSSI) and at least one other enzyme involved in **starch** synthesis;

(b) plant cell containing (I) that specifically inhibit expression of 3 or more enzymes involved in **starch** synthesis;

(c) plants, or their progeny, containing (I), that specifically inhibit granule-bound **starch** synthase I (GBSSI) and at least one other enzyme involved in **starch** synthesis;

(d) method (M1) of altering the **starch** composition of plants by introducing (I) that specifically inhibit granule-bound **starch** synthase I (GBSSI) and at least one other enzyme involved in **starch** synthesis;

(e) plants produced by (M1);

(f) **starch** produced by plants (produced by M1); and

(g) generally any **potato starch** that, in native form as extracted, has **freeze-thaw** stability.

USE - (I) is used in preparation of thickener compositions (for food or industrial use); packaging; adhesives; paper; coatings and personal care products (claimed).

ADVANTAGE - (I) has excellent **freeze-thaw** stability, without requiring expensive in vitro modification, permitting long-term storage of products containing it at low temperatures.

Dwg.0/22

FS CPI

FA AB; DCN

MC CPI: **C04-C02B**; C04-E02; C04-E06; C04-F0800E; C04-L08; C04-M01; D05-C03G; **D05-H14B3**; **D05-H16B**; **D06-H01**

TECH UPTX: 20010515

TECHNOLOGY FOCUS - BIOLOGY - Preferred **starch**: (I) is also charcterized by:

(1) **freeze-thaw** stability such that a 5 %weight/volume (% w/v) aqueous paste shows less than 40 (especially 10)% syneresis after 4 cycles of **freezing** at -70 degrees Celsius overnight, **thawing** at 22 degrees Celsius for 60 min, then centrifuging at 8000 g for 10 min at 18 degrees Celsius, or less than 30 (especially 10)% syneresis after 3 or 2 such cycles; (I) also has the same syneresis properties for a **freeze-thaw** cycle of 1 hr at -70 degrees Celsius and 10 min at 22 degrees Celsius, with centrifuging;

(2) an apparent amylose content less than 8%, and ratio of fraction I:fraction II short chain glucans of at least 60, preferably 70,%; optionally also a viscosity onset temperature below 67 degrees Celsius (best 51 degrees Celsius) (as determined by viscometric analysis of a 7.4% w/v aqueous suspension, using a Rapid Visco Amylograph, Newport Scientific instrument operated on the standard 1 heating and stirring protocol) and a gelation onset temperature below 67 degrees Celsius (best 50 degrees Celsius), when analyzed on a Perkin-Elmer DSC (differential scanning calorimter) 7, using a 10 mg sample in an aqueous mixture of less than 25 % w/v **starch** content. After extraction, (I) may be modified by physical, chemical and/or enzymatic processes.

TECHNOLOGY FOCUS - BIOTECHNOLOGY - Preferred plants: In the cells, at least one of **starch** synthase (SS) II and/or III is inhibited, particularly by expressing the appropriate antisense sequence or by sense suppression methods. The transformed cells are regenerated to plants conventionally. The cells are particularly from **potato** but may also be from rice, cassava or maize.

ABEX UPTX: 20010515

EXAMPLE - The full-length cDNA for **potato** granule bound **starch** synthase I (GBSSI) was cloned into the plant transformation vector pGPTV-HYG to form pSJ152, containing the GBSSI sequence in the opposite orientation with respect to a double 35S promoter. This vector was used, via Agrobacterium tumefaciens LBA4404, to transform **potato** explants (**microtubers** or leaf fragments) from the transgenic line 17.29 (Plant J., 17 (1999) 251) in which inhibition of the **starch** synthase (SSI) I and II enzymes was almost complete. The explants were regenerated conventionally. Two transgenic lines showed almost complete absence of GBSSI, and one of these lines (1829) produced a **starch** of only 2.67% amylose content, with Rapid Visco Amylograph onset and peak temperatures of 50.3 and 70.2 degrees Celsius, and differential scanning calorimetry onset and peak temperatures 48.6 and 53.2 degrees Celsius. When the **starch** was subjected to **freeze-thaw** cycles, its absorbance at 700 nm reached 1 unit only after 9-10 cycles, compared with an absorbance of 1.4 unit after a single cycle for wild-type **starch**.

L78 ANSWER 4 OF 18 WPIX (C) 2003 THOMSON DERWENT

AN **2001-236028** [25] WPIX

DNC **C2001-071063**

TI New nucleic acid encoding a **starch** synthase isoform from maize,

used to produce recombinant plants that produce **starch** with modified properties.

DC C06 D16 P13
IN FROHBERG, C
PA (AVET) AVENTIS CROPSCIENCE GMBH
CYC 94
PI DE 19937348 A1 20010222 (200125)* 32p C12N009-00 <--
WO 2001012826 A2 20010222 (200125) DE C12N015-82 <--
RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ NL OA PT SD SE SL SZ TZ UG ZW
W: AE AG AL AM AU AZ BA BB BG BR BY BZ CA CN CR CU CZ DM DZ EE GD GE HR HU ID IL IN IS JP KG KP KR KZ LC LK LR LT LV MA MD MG MK MN MX NO NZ PL RO RU SG SI SK TJ TM TR TT UA UZ VN YU ZA
AU 2000069937 A 20010313 (200134) C12N015-82 <--
BR 2000013115 A 20020423 (200235) C12N015-82 <--
EP 1200615 A2 20020502 (200236) DE C12N015-82 <--
R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI
CN 1378600 A 20021106 (200316) C12N015-82 <--
JP 2003507020 W 20030225 (200317) 104p C12N015-09 <--
ADT DE 19937348 A1 DE 1999-19937348 19990811; WO 2001012826 A2 WO 2000-EP7673 20000808; AU 2000069937 A AU 2000-69937 20000808; BR 2000013115 A BR 2000-13115 20000808, WO 2000-EP7673 20000808; EP 1200615 A2 EP 2000-958396 20000808, WO 2000-EP7673 20000808; CN 1378600 A CN 2000-809585 20000808; JP 2003507020 W WO 2000-EP7673 20000808, JP 2001-516913 20000808
FDT AU 2000069937 A Based on WO 200112826; BR 2000013115 A Based on WO 200112826; EP 1200615 A2 Based on WO 200112826; JP 2003507020 W Based on WO 200112826
PRAI DE 1999-19937348 19990811
IC ICM **C12N009-00; C12N015-09; C12N015-82**
ICS A01H005-00; A23L001-05; A23L001-052; A23L001-0522; C08B031-00; **C12N005-10; C12N009-10; C12N015-29;** C12P019-04
ICI C12N005-10; C12P019-04; C12R001:91; C12R001:91
AB DE 19937348 A UPAB: 20010508

NOVELTY - Nucleic acid (I) encoding a protein (II), or its active fragments, with **starch** synthase (SS) activity encoding a 1170 residue amino acid sequence (S2), comprising a 4121 base pair sequence (S1), both fully defined in the specification, or its complement, or containing the coding region of the cDNA insert in plasmid IR65/87 (DSM 12970) or its complement, is new.

DETAILED DESCRIPTION - Nucleic acid (I) encoding a protein (II), or its active fragments, with **starch** synthase (SS) activity encoding a 1170 residue amino acid sequence (S2), comprising a 4121 base pair sequence (S1), both fully defined in the specification, or its complement, or containing the coding region of the cDNA insert in plasmid IR65/87 (DSM 12970) or its complement, is new. (I) may be equivalent to the sequences within the degeneracy of the genetic code, or a fragment, allelic variant and/or derivative of them.

INDEPENDENT CLAIMS are also included for the following:

(1) vector containing (I);

(2) host cell, or transgenic plant cell, that contains (I) or the vector of (1), or is derived from such a cell;

(3) (II), or its active fragments, encoded by (I);

(4) production of (II), or its active fragments, by culturing cells of (2);

(5) plant containing transgenic cells of (2), and their replicative material;

(6) production of the plants of (5);

(7) **starch** produced by the plant cells of (2) or the plants of (5), or their replicative material; and

(8) production of modified **starch** by extraction from the plant cells of (2) or the plants of (5), or their **starch**-storing

parts.

USE - (I) is used to prepare transgenic plants (specifically maize) that have reduced or increased SS activity, resulting in formation of **starch** with different chemical and/or physical, and functional, properties, particularly altered viscosity and gel-forming properties. Fragments of (I) can also be used as probes to isolate related sequences from other organisms, also as antisense inhibitors of SS activity. The **starch** produced by the transgenic plants is useful for all usual nutritional and non-nutritional applications.

ADVANTAGE - Modified **starch** may be better suited to particular applications.

Dwg.0/1

FS CPI GMPI

FA AB; DCN

MC CPI: C04-A0800E; **C04-C02B2**; C04-E02; C04-E02E; C04-E02F; C04-E03; C04-E03E; C04-E03F; C04-E04; C04-E06; C04-E08; C04-F0100E; C04-F0800E; C04-L04; C04-L08; C11-A; D05-C03E; D05-C08; D05-H09; D05-H12A; D05-H12D1; D05-H12D2; D05-H12E; **D05-H14B3**; **D05-H16B**; D05-H17A3

TECH UPTX: 20010508

TECHNOLOGY FOCUS - BIOTECHNOLOGY - Preferred Nucleic Acid: (I) may be RNA or DNA and represents a new isoform of maize SS.

Preferred Vectors: The vectors contain regulatory elements that allow transcription and/or synthesis of translatable RNA in prokaryotes and/or eukaryotes. (I) may be in the antisense orientation with respect to the regulatory elements so that SS activity is reduced. This reduction may also be achieved by expressing a ribozyme, co-suppression or by in vivo mutagenesis. Particularly (I) is under control of an endosperm-specific promoter, e.g. the shrunken-1 promoter of maize.

Preferred Plants: The plants have reduced or increased activity of (II) relative to wild-type plants. They are particularly **starch** -storing plants, specifically maize, and are produced by conventional genetic modification of cells with (I) then regeneration.

Preparation: A cDNA library from maize was screened with the cDNA sequence encoding **potato** SSIII to isolate plasmid pZmSS6. The NotI-Bsp120 fragment of this vector, containing the complete coding sequence (S1), was used to produce the vector IR65/87 (DSM 12970). This vector was used to transform maize protoplasts and these were regenerated by standard methods.

TECHNOLOGY FOCUS - BIOLOGY - Preferred **Starch**: The modified **starch** produced by the transgenic plants may have alterations in amylose/amylopectin ratio, degree of branching, mean chain length, phosphate content; pasting properties, grain size and/or grain morphology, resulting in altered functional properties such as retrogradation, film-formation, gel strength, viscosity, color stability, enzymatic digestion, **freeze-thaw** stability, shear stability, transparency, water-binding, and pasting, binding or adhesion properties.

L78 ANSWER 5 OF 18 WPIX (C) 2003 THOMSON DERWENT

AN **2001-042604** [06] WPIX

DNC **C2001-012424**

TI Soluble branched glucose polymers with stable low viscosities useful in food compositions, e.g. as binders in instant liquid products.

DC A11 D16

IN BACKER, D; CABOCHE, J J; COMINI, S; FLECHE, G; LOOTEN, P; PETITJEAN, C; CABOCHE, J

PA (ROQF) ROQUETTE FRERES SA

CYC 93

PI FR 2792941 A1 20001103 (200106)* 28p C08B037-00

WO 2000066633 A1 20001109 (200106) FR C08B030-12 <--

RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW NL OA PT SD SE SL SZ TZ UG ZW

W: AE AG AL AM AT AU AZ BA BB BG BR BY CA CH CN CR CU CZ DE DK DM DZ
EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK
LR LS LT LU LV MA MD MG MK MN MW MX NO NZ PL PT RO RU SD SE SG SI
SK SL TJ TM TR TT TZ UA UG US UZ VN YU ZA ZW

AU 2000043052 A 20001117 (200111) C08B030-12 <--
EP 1177216 A1 20020206 (200218) FR C08B030-12 <--
R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT
RO SE SI
NO 2001005224 A 20011025 (200221) C08B030-12 <--
KR 2002010622 A 20020204 (200254) C08B030-12 <--
CN 1349544 A 20020515 (200260) C08B030-12 <--
JP 2002543248 W 20021217 (200312) 26p C08B031-00

ADT FR 2792941 A1 FR 1999-5523 19990430; WO 2000066633 A1 WO 2000-FR1109 20000426; AU 2000043052 A AU 2000-43052 20000426; EP 1177216 A1 EP 2000-922758 20000426, WO 2000-FR1109 20000426; NO 2001005224 A WO 2000-FR1109 20000426, NO 2001-5224 20011025; KR 2002010622 A KR 2001-713894 20011030; CN 1349544 A CN 2000-806938 20000426; JP 2002543248 W JP 2000-615661 20000426, WO 2000-FR1109 20000426

FDT AU 2000043052 A Based on WO 200066633; EP 1177216 A1 Based on WO 200066633; JP 2002543248 W Based on WO 200066633

PRAI FR 1999-5523 19990430

IC ICM **C08B030-12**; C08B031-00; C08B037-00
ICS A23L001-09; **C12N009-10**; C12P019-04; C12P019-16

ICI C12N009-10, C12R001:89

AB FR 2792941 A UPAB: 20010126

NOVELTY - Soluble branched glucose polymers (I) with no beta -glucoside linkages, 4-6.5% alpha -1,6-glucoside linkages, little or no tendency to undergo retrogradation in aqueous solution, a viscosity of 200-5000 cP and a molecular weight of 100,000-500000000, are new.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the following:

(1) production (II) of (I) by heating an aqueous suspension containing at least 2 (preferably 2-5) % by weight (wt.%) **starch** or a **starch** derivative at a temperature above 130 deg. C (preferably 140-150 deg. C) and a pressure above 3.5 bar (preferably 4-5 bar) for at least 2 minutes (preferably 2-5 minutes) and treating the product with 500-2000 units of a purified branching enzyme at 25-40 deg. C (preferably 30 deg. C) for 10 minutes to 20 hours; and

(2) compositions containing (I) for use in the food industry.

USE - (I) are useful in food compositions, e.g. as binders in instant liquid products, including refrigerated and **frozen** products.

ADVANTAGE - Aqueous solutions of (I) have a stable low viscosity and good **freeze-thaw** stability.

Dwg.0/0

FS CPI

FA AB

MC CPI: A03-A00A; A10-E; A12-W09; D03-H01Q; D03-H01R; D05-A02; D05-A04; D05-C08; D05-H08

TECH UPTX: 20010126

TECHNOLOGY FOCUS - BIOTECHNOLOGY - Preferred Branching Enzyme: This is a glycogen or **starch** branching enzyme derived from a plant, yeast, bacterium or unicellular alga, especially a genetically modified unicellular alga.

Preparation: (I) is prepared by (II).

ABEX UPTX: 20010126

EXAMPLE - A 2.5% suspension of waxy maize **starch** was heated at 145 degreesC and 4 bar in a tubular cooker with a residence time of 3 minutes. The product (1500 ml) was cooled to room temperature, diluted to 3750 ml with 0.1 M Tris-HCl buffer (pH 7), treated with a solution of recombinant Clamydomonas reinhardtii **starch** branching enzymes (19 ml, 1100 U/mg), and incubated at 30degreesC for 30 minutes. The product was precipitated with ethanol, filtered, washed and dried to give a polymer containing 4.3% alpha-1,6-glucoside linkages.

L78 ANSWER 6 OF 18 WPIX (C) 2003 THOMSON DERWENT
AN **2000-400088** [34] WPIX
DNN **N2000-299675** DNC **C2000-120880**
TI Transgenic wheat or maize plants with altered **starch** synthesizing ability, useful for producing **starch** with altered properties that are beneficial in terms of **starch** processing.
DC C06 D16 P13
IN BURRELL, M M
PA (ADTE-N) ADVANCED TECHNOLOGIES CAMBRIDGE LTD; (ADTE-N) ADVANCED TECHNOLOGIES CAMBRIDGE
CYC 87
PI WO 2000031282 A1 20000602 (200034)* EN 53p C12N015-82 <--
RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW NL OA PT SD SE SL SZ TZ UG ZW
W: AE AL AM AT AU AZ BA BB BG BR BY CA CH CN CR CU CZ DE DK DM EE ES FI GB GE GH GM HR HU ID IL IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT UA UG UZ VN YU ZA ZW
AU 2000011690 A 20000613 (200043) C12N015-82 <--
ADT WO 2000031282 A1 WO 1999-GB3762 19991108; AU 2000011690 A AU 2000-11690 19991108
FDT AU 2000011690 A Based on WO 200031282
PRAI GB 1998-25262 19981119
IC ICM **C12N015-82**
ICS A01H005-00; **C08B030-00**; **C12N015-54**
AB WO 200031282 A UPAB: 20000718
NOVELTY - New transgenic wheat or maize plants (I) with altered **starch** synthesizing ability, comprise a chimeric gene having a promoter, a coding sequence for glycogen branching enzyme and a terminator.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the following:

(1) a method of altering the **starch** in maize or wheat plants, comprises stably introducing into the plant genome a chimeric gene comprising a nucleic acid sequence encoding glycogen branching enzyme under the direction of a suitable promoter and a suitable terminator, and regenerating a plant having an altered genome;

(2) **starch** obtained from wheat or maize transformed by the method of (1), where the **starch** has an altered chain length and/or processing property compared with control **starch** from a non-transformed plant;

(3) seed of (I);

(4) maize or wheat plant cells containing a chimeric gene comprising a promoter, a coding sequence for glycogen branching enzyme, and a terminator;

(5) maize or wheat plant cells transformed by the method of (1) and containing **starch** having a decrease chain length;

(6) a construct defined in the specification and deposited under NCIMB Accession No. 40982; and

(7) a construct comprising a promoter-gene fragment-terminator cassette comprising a transit peptide and a coding sequence for glycogen branching enzyme.

USE - The transgenic wheat or maize plants are useful for producing **starch** with altered properties that are beneficial in terms of **starch** processing, for e.g. the **freeze-thaw** stability of the **starch** is improved.

The **starch** produced can be used as food in animal diets. The **starch** is also useful in the industrial production of paper, textiles, plastic and adhesives.

ADVANTAGE - The **freeze-thaw** stability of the **starch** is improved (claimed).

Dwg.0/12

FS CPI GMPI
FA AB; DCN
MC CPI: C04-A08C2E; C04-A09F; **C04-C02B**; C04-E08; C04-F0800E;
D05-H12E; **D05-H14B3; D05-H16B**
TECH UPTX: 20000718
TECHNOLOGY FOCUS - AGRICULTURE - Preferred Method: In the method of (1), the nucleic acid sequence encoding glycogen branching enzyme is a sequence obtained from a unicellular organism, an alga or bacterium such as E. coli, Agrobacterium, Salmonella or Bacillus.
The promoter is capable of directing expression in a particular tissue of the plant and/or at particular stages of development of the plant. The promoter is heterologous or homologous with respect to the plant. The promoter directs expression to the endosperm of the seed. The promoter is the high molecular weight glutenin (HMWG) gene of wheat. Preferably, the promoter is one or more of the promoters of gliadin, branching enzyme, ADPG (undefined) pyrophosphorylase, **starch** synthase or actin.
The chimeric gene also contains a sequence that encodes a transit peptide which provides for translocation of the glycogen branching enzyme and/or a marker gene or other coding sequence to the plant plastid.
The transit peptide is one or more of the group consisting of the small subunit of the ribulose bisphosphate carboxylase enzyme (ssu of Rubisco) from pea, maize or sunflower, the transit peptide for the plant plastid acyl carrier protein (ACP) or the transit peptide for **starch** granule bound synthase I (GBSSI).
The chimeric gene comprises one or more additional coding sequences from the **starch** or glycogen biosynthetic pathway. The additional coding sequence is the sequence of glycogen synthase (EC 2.4.1.21). The chimeric gene also comprises a gene switch mechanism which determines under what conditions or when the coding sequence is to be expressed. The gene switch is a chemically induced promoter or a temperature controlled promoter.
Preferred **Starch**: The chain length is decreased. The viscosity is increased, which affects the processing properties of the **starch**. The degree of retrogradation of the **starch** is lower, where the altered degree of retrogradation affects the processing properties of the **starch**.
ABEX UPTX: 20000718
EXAMPLE - Methods for the transformation of wheat by particle bombardment are well known in the art, for e.g. see Vasil et al., Bio/Technology, 667-674, (1992). Immature embryos of wheat were used to initiate embryogenic callus. The callus was subcultured and used for particle bombardment with gold particles coated with plasmid DNA.
Two plasmids were used per bombardment, one plasmid carried the construct of interest, in this case pDV03201 (comprising the glgB (coding sequence for E. coli glycogen branching enzyme) DNA). The second plasmid carried a selectable marker which expresses the gene responsible for resistance to the herbicide Basta. Plants resistant to Basta were generally found to also have the recombinant gene of interest present. Bombarded calli were grown on Basta selection media and surviving calli were transferred to regeneration medium. Rooted plants were transferred to soil and grown to maturity in a growth room. Primary transformant wheat plants (T0) were selfed to produce transgenic seed. Seed were extracted for protein and the protein analyzed by western blotting for the presence of E. coli glgB polypeptide.

L78 ANSWER 7 OF 18 WPIX (C) 2003 THOMSON DERWENT
AN **2000-400083** [34] WPIX
DNN **N2000-299672** DNC **C2000-120875**
TI Transgenic wheat or maize plants with altered **starch** synthesizing ability, useful for producing **starch** with altered properties that are beneficial in terms of **starch** processing.
DC C06 D16 P13
IN BURRELL, M M

PA (ADTE-N) ADVANCED TECHNOLOGIES CAMBRIDGE LTD; (ADTE-N) ADVANCED TECHNOLOGIES CAMBRIDGE

CYC 89

PI WO 2000031274 A1 20000602 (200034)* EN 63p C12N015-54 <--
RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW NL OA PT SD SE SL SZ TZ UG ZW
W: AE AL AM AT AU AZ BA BB BG BR BY CA CH CN CR CU CZ DE DK DM EE ES FI GB GE GH GM HR HU ID IL IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT UA UG UZ VN YU ZA ZW
AU 2000010616 A 20000613 (200043) C12N015-54 <--
EP 1131442 A1 20010912 (200155) EN C12N015-54 <--
R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI
US 6468799 B1 20021022 (200273) C12N015-29 <--

ADT WO 2000031274 A1 WO 1999-GB3734 19991109; AU 2000010616 A AU 2000-10616 19991109; EP 1131442 A1 EP 1999-954197 19991109, WO 1999-GB3734 19991109; US 6468799 B1 US 1999-444728 19991118

FDT AU 2000010616 A Based on WO 200031274; EP 1131442 A1 Based on WO 200031274

PRAI GB 1998-25242 19981119

IC ICM **C12N015-29**; **C12N015-54**
ICS A01H005-00; A23L001-0522; **C08B030-00**; **C12N005-04**; **C12N005-10**; **C12N015-82**

AB WO 200031274 A UPAB: 20000718
NOVELTY - New transgenic wheat or maize plants (I) with altered **starch** synthesizing ability, comprise a chimeric gene having a promoter, a coding sequence for glycogen synthase and a terminator.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the following:

(1) a method of altering the **starch** in maize or wheat plants, comprises stably introducing into the plant genome a chimeric gene comprising a nucleic acid sequence encoding glycogen synthase under the direction of a suitable promoter and a suitable terminator, and regenerating a plant having an altered genome;

(2) **starch** obtained from wheat or maize transformed by the method of (1), where the **starch** has an altered chain length and/or processing property compared with control **starch** from a non-transformed plant;

(3) maize or wheat plant cells containing a chimeric gene comprising a promoter, a coding sequence for glycogen synthase, and a terminator;

(4) seed of (I);

(5) maize or wheat plant cells transformed by the method of (1) and containing **starch** having a decrease chain length;

(6) a construct defined in the specification and deposited under NCIMB Accession No. 40962; and

(7) a construct comprising a promoter-gene fragment-terminator cassette comprising a transit peptide and a coding sequence for glycogen synthase derived from a micro-organism.

USE - The transgenic wheat or maize plants are useful for producing **starch** with altered properties that are beneficial in terms of **starch** processing, for e.g. the **freeze-thaw** stability of the **starch** is improved.

The **starch** produced can be used as food in animal diets. The **starch** is also useful in the industrial production of paper, textiles, plastic and adhesives.

ADVANTAGE - The **freeze-thaw** stability of the **starch** is improved (claimed).

Dwg.0/17

FS CPI GMPI

FA AB; DCN

MC CPI: C04-A08C2E; C04-A09F; **C04-C02B**; C04-E08; C04-F0800E; D05-H12E; **D05-H14B3**; **D05-H16B**

TECH UPTX: 20000718

TECHNOLOGY FOCUS - AGRICULTURE - Preferred Method: In the method of (1), the nucleic acid sequence encoding glycogen synthase is a sequence obtained from a unicellular organism, an alga or bacterium such as E. coli, Agrobacterium, Salmonella or Bacillus.
The promoter is capable of directing expression in a particular tissue of the plant and/or at particular stages of development of the plant. The promoter is heterologous or homologous with respect to the plant. The promoter directs expression to the endosperm of the seed. The promoter is the high molecular weight glutenin (HMWG) gene of wheat. Preferably, the promoter is one or more of the promoters of gliadin, branching enzyme, ADPG (undefined) pyrophosphorylase, **starch** synthase or actin.
The chimeric gene also contains a sequence that encodes a transit peptide which provides for translocation of the glycogen synthase and/or a marker gene or other coding sequence to the plant plastid.
The transit peptide is one or more of the group consisting of the small subunit of the ribulose bisphosphate carboxylase enzyme (ssu of Rubisco) from pea, maize or sunflower, the transit peptide for the plant plastid acyl carrier protein (ACP) or the transit peptide for **starch** granule bound synthase I (GBSSI).
The chimeric gene comprises one or more additional coding sequences from the **starch** or glycogen biosynthetic pathway. The additional coding sequence is the sequence of glycogen branching enzyme (EC 2.4.1.18). The chimeric gene also comprises a gene switch mechanism which determines under what conditions or when the coding sequence is to be expressed. The gene switch is a chemically induced promoter or a temperature controlled promoter.
Preferred **Starch**: The chain length is increased, preferably between 17 and 18 glucose units. The viscosity is decreased, which affects the processing properties of the **starch**. The degree of retrogradation of the **starch** is altered, where the altered degree of retrogradation affects the processing properties of the **starch**.

ABEX UPTX: 20000718

EXAMPLE - Methods for the transformation of wheat by particle bombardment are well known in the art, for e.g. see Vasil et al., Bio/Technology, 667-674, (1992). Immature embryos of wheat were used to initiate embryogenic callus. The callus was subcultured and used for particle bombardment with gold particles coated with plasmid DNA.
Two plasmids were used per bombardment, one plasmid carried the construct of interest, in this case pDV03191 (comprising the glgA (coding sequence for E. coli glycogen synthase) DNA). The second plasmid carried a selectable marker which expresses the gene responsible for resistance to the herbicide Basta. Plants resistant to Basta were generally found to also have the recombinant gene of interest present. Bombarded calli were grown on Basta selection media and surviving calli were transferred to regeneration medium. Rooted plants were transferred to soil and grown to maturity in a growth room. Primary transformant wheat plants (T0) were selfed to produce transgenic seed. Seed were extracted for protein and the protein analyzed by western blotting for the presence of E. coli glgA polypeptide.

L78 ANSWER 8 OF 18 WPIX (C) 2003 THOMSON DERWENT
AN 2000-126546 [11] WPIX
DNN N2000-095371 DNC C2000-038539
TI Altering characteristics of plants by inhibiting expression of **starch** synthase enzymes, used to produce modified **starch** with reduced viscosity onset temperature.
DC A11 A97 C06 D16 F06 F09 G03 P13
IN EDWARDS, E A; **JOBLING, S A**; MARTIN, C R; **SCHWALL, G P**; SMITH, A M; **WESTCOTT, R J**
PA (NATT) NAT STARCH & CHEM INVESTMENT HOLDING COR
CYC 87
PI WO 9966050 A1 19991223 (200011)* EN 49p C12N015-54

RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW NL
OA PT SD SE SL SZ UG ZW
W: AE AL AM AT AU AZ BA BB BG BR BY CA CH CN CU CZ DE DK EE ES FI GB
GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU
LV MD MG MK MN MW MX NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR
TT UA UG US UZ VN YU ZA ZW

AU 9943802 A 20000105 (200024) C12N015-54
EP 1092033 A1 20010418 (200123) EN C12N015-54
R: AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE
JP 2002518015 W 20020625 (200243) 55p C12N015-09

ADT WO 9966050 A1 WO 1999-GB1902 19990615; AU 9943802 A AU 1999-43802 19990615; EP 1092033 A1 EP 1999-926617 19990615, WO 1999-GB1902 19990615; JP 2002518015 W WO 1999-GB1902 19990615, JP 2000-554859 19990615

FDT AU 9943802 A Based on WO 9966050; EP 1092033 A1 Based on WO 9966050; JP 2002518015 W Based on WO 9966050

PRAI EP 1998-304716 19980615

IC ICM C12N015-09; C12N015-54
ICS A01H005-00; A21D002-36; **C08B030-04**; C12N015-82

AB WO 9966050 A UPAB: 20000301

NOVELTY - One or more characteristics of a plant are modified by introducing at least two sequences (I), or their fragments or functional equivalents, each comprising a gene that encodes an enzyme (II) with **starch** synthase activity. Each (I) is linked to a promoter and is able to affect expression of the corresponding endogenous gene.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the following:

(a) plants modified this way and their progeny or parts;

(b) **starch** obtained from the plants of (a);

(c) **starch** obtained from potato and having

(i) viscosity onset temperature less than 55 deg. C (measured at atmospheric pressure on a 10wt.% aqueous suspension in a Newport Scientific Rapid Visco Analyser (viscoamylograph)) or

(ii) endosperm onset temperature less than 50 deg. C (measured by differential scanning calorimetry on a Perkin-Elmer DSC7);

(d) production of **starch** by extracting plants of (a);

(e) nucleic acid construct (A) containing at least two (I), operably linked to a promoter; and (f) plants, or their parts or progeny, containing (A).

ACTIVITY - None given.

MECHANISM OF ACTION - Altering activity of **starch** synthesis enzymes, by sense or antisense suppression of endogenous genes.

USE - The modified plants are used to produce **starch** for use in production or processing of foods, paper, textiles and adhesives (claimed).

ADVANTAGE - **Starch** produced by the transgenic plants has a lower viscosity onset temperature, so requires milder processing conditions (reduced energy demand) and, in foods, imparts better quality and color with reduced off-flavors or volatiles.

Dwg.0/14

FS CPI GMPI

FA AB; DCN

MC CPI: A03-A; A10-A; C04-A0800E; **C04-C02B**; C04-E02; D05-C08; D05-H08; D05-H12E; D05-H16B; D05-H18; F05-A06B; G03-B02A

TECH UPTX: 20000301

TECHNOLOGY FOCUS - BIOLOGY - Preferred **Starch**: This has (i) viscosity onset temperature (measured as above) at least 10, preferably 12,degreesC lower than that of **starch** from unmodified plants;
(ii) endosperm onset temperature (measured as above) at least 15, especially 17,degreesC lower (best less than 44degreesC) and (iii) contains more modules with degree of polymerization (DP) 6-12 but fewer modules with DP 15-24 (measured by high performance anion-exchange chromatography on a Dionex Carbopac DA-100 column). The specification

includes a graph comparing DP distribution for modified and native **starch**.
TECHNOLOGY FOCUS - BIOTECHNOLOGY - Preferred Process: All (I) are introduced simultaneously, particularly on a single nucleic acid construct, or one (I) is introduced first, selection made for presence of this (I), then one or more additional (I) introduced (e.g. by crossing plants each containing a single (I)). (I) are particularly linked, (in)directly, in the antisense orientation with respect to the promoter (which may be constitutive or tissue-specific). Particularly (I) are derived from the genes for **starch** synthases (SS) II and (III), especially from potato, or their equivalents.
Preferred plants: These are potato (most preferred), cassava, maize, wheat, barley, tomato, rice and pea.
Preparation: Transfer vectors are made by standard methods, e.g. isolating fragments from the appropriate genes and cloning them, usually in antisense orientation, into a plant transfer vector. The recombinant vector is then introduced into plant cells, and these regenerated to plants, by known methods.

ABEX UPTX: 20000301
EXAMPLE - Vector pPOT17 is the plant transfer vector pBIN19 containing in antisense orientation, a 1.2 kb BglII-BamHI fragment of cDNA for potato **starch** synthase (SS) II and a 1.14 kb fragment PstI-EcoRV fragment of cDNA for potato SS III. This plasmid was transferred, using Agrobacterium tumefaciens LBA4404, into potato tuber disks, and these regenerated to plants. The tubers that developed had significanlty lower activities of SS II and III in the soluble fraction, but not in the granule-bound fraction. **Starch** granules were radially cracked and sunk in the center, and the **starch** had endosperm onset temperature 43-44degreesC compared with 60-61degreesC for the wild-type.

L78 ANSWER 9 OF 18 WPIX (C) 2003 THOMSON DERWENT
AN 1999-229220 [19] WPIX
DNC C1999-067421
TI New isolated potato isoamylase-type debranching enzyme gene.
DC C06 D16 D17
IN **JOBLING, S A; SCHWALL, G P; WESTCOTT, R J**
PA (NATT) NAT STARCH & CHEM INVESTMENT HOLDING COR
CYC 21
PI WO 9912950 A2 19990318 (199919)* EN 50p C07H021-00
RW: AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE
W: AU CA US
AU 9889911 A 19990329 (199932) C07H021-00
EP 1009751 A2 20000621 (200033) EN C07H021-00
R: AT BE DE DK ES FI FR GB GR IT NL PT SE
ADT WO 9912950 A2 WO 1998-GB2665 19980904; AU 9889911 A AU 1998-89911 19980904; EP 1009751 A2 EP 1998-941593 19980904, WO 1998-GB2665 19980904
FDT AU 9889911 A Based on WO 9912950; EP 1009751 A2 Based on WO 9912950
PRAI GB 1997-18863 19970906
IC ICM C07H021-00
AB WO 9912950 A UPAB: 19990518
NOVELTY - (A) A novel nucleic acid sequence is obtainable from potato plants and carries at least a portion of an isoamylase-type debranching enzyme (DBE) gene.
DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for:
(1) a nucleic acid construct comprising a sequence as in (A) operably lined in the sense or antisense orientation to a promoter active in a plant;
(2) a host cell into which has been introduced a sequence as in (A), or a construct as in (1);
(3) a plant cell as in (2);
(4) a plantlet grown from a plant cell as in;
(5) a method of altering a plant by inhibiting the expression of an isoamylase comprising introducing into the plant at least 200bp of a

sequence carrying an isoamylase gene and exhibiting at least 80% identity with a nucleic acid sequence shown, the sequence being operably linked in the sense or antisense orientation to a suitable promoter active in the plant, and causing transcription of the introduced nucleic acid sequence, the transcript and/or the translation product being sufficient to interfere with the expression of a homologous isoamylase gene naturally present in the plant; and

(6) a plant altered by a method as in (5) or the progeny.

USE - The constructs can be used to alter the **starch** properties of plants such as potato, sweet potato, maize, wheat, barley, oat, cassava, pea or rice (claimed). The **starch** can have increased branching and/or shorter chain length, reduced peak viscosity, higher setback viscosity or increased viscosity onset temperature (claimed).

ADVANTAGE - By using an antisense sequence with greater homology to the native gene, greater inhibition can be acheived

Dwg.0/13

FS CPI

FA AB; DCN

MC CPI: C04-E02E; C04-E08; C04-F0800E; C04-P02; D05-H12D1; D05-H12E; D05-H14B3; D05-H16B; D06-H

TECH UPTX: 19990510

TECHNOLOGY FOCUS - BIOTECHNOLOGY - Isolation: There are 2 regions within isoamylase proteins that are conserved. One of these is the same DGFRFD found in the pullulanase enzymes and the second (MDVVF/YNH) is found approximately70 amino acids from this sequence towards the N-terminus. Degenerate oligonucleotide primers were made corresponding to these sequences (DBE2) and (DBE1) respectively, taking into consideration the codon usage in plant genes in order to reduce the degeneracy of the primers.

(1) TCA AAW CKR AAi CCA TC (DBE2); and

(2) ATG GAT GTT GTH TWY AAY CAT (DBE1).

These were used in a PCR reaction using first strand cDNA from potato leaf or tuber RNA or genomic DNA as template. The product was used to obtain a 1.5kb DNA sequence. The ORF contains 429 amino acids and is 77% identical to the maize isoamylase protein encoded by the sugary-1 gene. A PCR based cloning strategy was also used for isolating pullulanase type debranching enzymes from potato, using conserved domains within the known cloned gene sequences, of which spinach was the only plant gene (GenBank SOPULSPO1). A product was obtained comprising 672 bp. Comparison of this sequence to the spinach gene showed it to be 75.7% identical at the DNA level and 75.5% at the protein level.

ABEX UPTX: 19990510

EXAMPLE - A plant transformation vector with the hygromycin selectable marker was constructed in which the 1.5kb isoamylase cDNA from plasmid pSJ132 was inserted in an antisense orientation under the control of the granule bound **starch** synthase (GBSS) promoter. This vector (pSJ138) was then used to transform wild type and waxy potato plants. The results showed that transformed potatoes were obtained which did not produce isoamylase activity.

L78 ANSWER 10 OF 18 WPIX (C) 2003 THOMSON DERWENT

AN 1998-286958 [25] WPIX

DNN N1998-225473 DNC C1998-088989

TI **Starch** branching gene from cassava - useful for producing altered plants giving modified **starch**.

DC C06 D16 P13

IN **JOBLING, S A**; SAFFORD, R

PA (NATT) NAT STARCH & CHEM; (NATT) NAT STARCH & CHEM INVESTMENT HOLDING COR

CYC 23

PI WO 9820145 A2 19980514 (199825)* EN 67p C12N015-82

RW: AT BE CH DE DK ES FI FR GB GR IE IT LU MC NL PT SE

W: AU BR CA JP KR US

GB 2320716 A 19980701 (199828) C12N009-10
AU 9748747 A 19980529 (199841) C12N015-82
EP 941352 A2 19990915 (199942) EN C12N015-82
R: AT BE DE DK ES FI FR GR IT NL PT SE
AU 730900 B 20010315 (200121) C12N015-82
GB 2320716 B 20010620 (200136) C12N009-10
ADT WO 9820145 A2 WO 1997-GB3032 19971104; GB 2320716 A GB 1997-23142 19971104; AU 9748747 A AU 1997-48747 19971104; EP 941352 A2 EP 1997-911332 19971104, WO 1997-GB3032 19971104; AU 730900 B AU 1997-48747 19971104; GB 2320716 B GB 1997-23142 19971104
FDT AU 9748747 A Based on WO 9820145; EP 941352 A2 Based on WO 9820145; AU 730900 B Previous Publ. AU 9748747, Based on WO 9820145
PRAI GB 1996-23095 19961105
IC ICM C12N009-10; C12N015-82
ICS A01H005-00; C12N001-21; C12N015-54; C12N015-56; C12Q001-68
AB WO 9820145 A UPAB: 19980624
Starch branching gene from cassava comprises a nucleic acid sequence which encodes a polypeptide having **starch** branching enzyme (SBE) activity, where the encoded polypeptide comprises a portion of an amino acid sequence given the specification.
Also claimed are:
(1) a nucleic acid sequence comprising at least 200 bp and exhibiting at least 88% sequence identity with the corresponding region of the DNA sequence shown, operably linked in the sense or anti-sense orientation to a promoter operable in plants;
(2) a polypeptide having SBE activity encoded by the above gene which comprises an amino acid sequence as shown in the specification;
(3) plants, their progeny or plant cells into which has been artificially introduced the nucleic acid of ;
starch obtainable from an altered plant as in , having altered properties compared to **starch** extracted from an equivalent but unaltered plant.
USE - The products can be used for producing plants having altered **starch** quantities and qualities. They can also be used for producing altered plants such as cassava, banana, potato, pea, tomato, maize, wheat, barley, oat, sweet potato and rice plants.
Dwg.0/0
FS CPI GMPI
FA AB; DCN
MC CPI: C04-A08; **C04-C02B**; C04-E02; C04-E02F; C04-F08; C04-N01; C04-N03; D05-H12B2; D05-H12D2; D05-H16B

L78 ANSWER 11 OF 18 WPIX (C) 2003 THOMSON DERWENT
AN 1996-506170 [50] WPIX
DNN N1996-426462 DNC C1996-158850
TI New potato plant **starch** having high amylose content - also class A **starch** branching enzyme and corresp. DNA to alter the viscosity of **starch**; for use in food, biodegradable products, adhesives, etc..
DC C06 D16 D17 F06 G02 G03 P13
IN COOKE, D; DEBET, M; GIDLEY, M J; **JOBLING, S A**; SAFFORD, R; SIDEBOTTOM, C M; **WESTCOTT, R J**
PA (NATT) NAT STARCH & CHEM INVESTMENT HOLDING COR
CYC 23
PI WO 9634968 A2 19961107 (199650)* EN 142p C12N015-82
RW: AT BE CH DE DK ES FI FR GB GR IE IT LU MC NL PT SE
W: AU BR CA JP KR US
AU 9655099 A 19961121 (199711) C12N015-82
WO 9634968 A3 19961205 (199712) C12N015-82
EP 826061 A2 19980304 (199813) EN C12N015-82
R: AT BE DE DK ES FI FR GB GR IT NL PT SE
AU 706009 B 19990603 (199933) C12N015-82
ADT WO 9634968 A2 WO 1996-GB1075 19960503; AU 9655099 A AU 1996-55099

19960503; WO 9634968 A3 WO 1996-GB1075 19960503; EP 826061 A2 EP 1996-912161 19960503, WO 1996-GB1075 19960503; AU 706009 B AU 1996-55099 19960503
FDT AU 9655099 A Based on WO 9634968; EP 826061 A2 Based on WO 9634968; AU 706009 B Previous Publ. AU 9655099, Based on WO 9634968
PRAI GB 1996-7409 19960410; GB 1995-9229 19950505
REP 8.Jnl.Ref; JP 06261767; WO 9012084; WO 9211375; WO 9214827; WO 9424292; WO 9507355; WO 9526407; WO 9619581
IC ICM C12N015-82
ICS A01H005-00; **C08B030-04**; C12N015-54
AB WO 9634968 A UPAB: 19961219
A new **starch** extracted from a potato plant has an amylose content of 35%, as determined by the idiometric assay method of Morrison and Laignelet (1983. J. Cereal Science 1, 9-20).
USE - The **starch** is used in the prepn. or processing of a foodstuff, such as in providing films, barriers, coatings or as gelling agents. The resistant **starch** compsns. are used in the prepn. or processing of corrugating adhesives, biodegradable prods., packaging, glass fibres or textiles (claimed). The characteristics (e.g. **starch** compsn.) of a plant are altered by introducing the NS linked to a promoter. The SBE is used to modify **starch** in vitro.
Dwg.0/13
FS CPI GMPI
FA AB
MC CPI: **C04-C02B2**; D05-H12A; D05-H12E; D05-H14; D05-H16B; D05-H17A3; **D06-H01**; F01-H06; G02-A02A; G03-B02A

L78 ANSWER 12 OF 18 WPIX (C) 2003 THOMSON DERWENT
AN 1995-351326 [45] WPIX
DNN N1995-261962 DNC C1995-153906
TI New transformed potato plants or their progeny - contg. anti sense **starch** branching enzyme cDNA used for producing **starch** with altered properties.
DC C06 D16 D17 F06 F09 G03 P13
IN COOKE, D; GIDLEY, M J; **JOBLING, S A**; SAFFORD, R; SIDEBOTTOM, C M; **WESTCOTT, R J**
PA (NATT) NAT STARCH & CHEM INVESTMENT; (NATT) NAT STARCH & CHEM INVESTMENT HOLDING COR
CYC 58
PI WO 9526407 A1 19951005 (199545)* EN 36p C12N015-82
RW: AT BE CH DE DK ES FR GB GR IE IT KE LU MC MW NL OA PT SD SE SZ UG
W: AM AT AU BB BG BR BY CA CH CN CZ DE DK ES FI GB GE HU JP KE KG KP KR KZ LK LT LU LV MD MG MN MW NL NO NZ PL PT RO RU SD SE SI SK TJ TT UA US UZ VN
AU 9519028 A 19951017 (199604) C12N015-82
EP 754235 A1 19970122 (199709) EN C12N015-82
R: AT BE DE ES FR GB IT NL SE
AU 688006 B 19980305 (199820) C12N015-82
US 6103893 A 20000815 (200041) C08B030-00 <--
CA 2186399 C 20010904 (200155) EN C12N015-54
ADT WO 9526407 A1 WO 1995-GB634 19950322; AU 9519028 A AU 1995-19028 19950322; EP 754235 A1 EP 1995-911460 19950322, WO 1995-GB634 19950322; AU 688006 B AU 1995-19028 19950322; US 6103893 A WO 1995-GB634 19950322, US 1996-716449 19960924; CA 2186399 C CA 1995-2186399 19950322, WO 1995-GB634 19950322
FDT AU 9519028 A Based on WO 9526407; EP 754235 A1 Based on WO 9526407; AU 688006 B Previous Publ. AU 9519028, Based on WO 9526407; US 6103893 A Based on WO 9526407; CA 2186399 C Based on WO 9526407
PRAI EP 1995-300210 19950113; GB 1994-6022 19940325; EP 1994-305806 19940804
REP 05Jnl.Ref; DE 4104782; WO 9211375; WO 9214827
IC ICM **C08B030-00**; C12N015-54; C12N015-82

ICS A01H005-00; **C08B030-04**; **C08B030-14**; **C08B030-20**; C12N015-11

AB WO 9526407 A UPAB: 19951114

Transformed potato plants or their progeny capable of giving rise to tubers having altered **starch**, comprising at least an effective portion of a **starch** branching enzyme (SBE) cDNA operably linked in the antisense orientation to a suitable promoter, such that the level of SBE is limited to less than 0.8 units per gram of tuber, are claimed. Also claimed are: (1) a vector for modifying a potato plant so as to cause the plant to be capable of giving rise to tubers having less than 0.8 units of SBE activity per gram of tuber, the vector comprising at least an effective portion of a SBE cDNA operably linked in the antisense orientation to a suitable promoter; (2) altered **starch** extracted from transformed potato plants or their progeny, the plants having less than 0.8 units SBE activity per gram of tuber, where the extracted **starch** has the following physical properties: (i) an elevated peak temp. of gelatinisation (detd. by differential scanning calorimetry (DSC)), relative to unaltered **starch** extracted from equivalent non-transformed plants; and (ii) an elevated viscosity onset temp., relative to unaltered **starch** extracted from equivalent non-transformed plants.

USE - The **starches** can be used in food and non-food (e.g. paper, textiles and adhesives) applications.

ADVANTAGE - The plants have low levels of SBE activity, and produce **starches** with elevated peak temps. of gelatinisation and viscosity onset.

Dwg.0/8

FS CPI GMPI

FA AB; DCN

MC CPI: C04-A08C2E; C04-E08; D05-H12D2; D05-H12E; D05-H16B; **D06-H01**; F01-H06; F05-A06B; F05-A06C; G03-B02A

L78 ANSWER 13 OF 18 WPIX (C) 2003 THOMSON DERWENT

AN **1991-267128** [36] WPIX

DNC **C1991-115836**

TI High density liq. yeast compsns. - comprising fresh yeast and poly hydroxy cpd. with improved **freeze-thaw** properties etc..

DC A97 D16 E13 E17

IN SUORANTA, K

PA (ALKO-N) ALKO LTD; (ALKO-N) ALKO GROUP LTD; (LALL-N) LALLEMAND INC; (ALKO-N) ALKO LTD FINNISH STATE ALCOHOL CO

CYC 40

PI WO 9112315 A 19910822 (199136)*
RW: AT BE CH DE DK ES FR GB GR IT LU NL OA SE
W: AT AU BB BG BR CA CH DE DK ES FI GB HU JP KP KR LK LU MC MG MW NL NO PL RO SD SE SU US

AU 9172288	A	19910903	(199148)				
CS 9100402	A	19910915	(199148)				
PT 96762	A	19911031	(199148)				
ZA 9100336	A	19920226	(199213)				
CN 1054098	A	19910828	(199222)			C12N001-16	<--
FI 9203665	A	19920814	(199245)			C12N000-00	<--
EP 515406	A1	19921202	(199249)	EN	30p	C12N001-18	<--
R: AT BE CH DE DK ES FR GB GR IT LI LU NL SE							
NZ 237119	A	19930727	(199333)			C12N001-04	<--
AU 643505	B	19931118	(199402)			C12N001-18	<--
US 5427943	A	19950627	(199531)		12p	C12N001-16	<--
EP 515406	B1	19951227	(199605)	EN	18p	C12N001-18	<--
R: AT BE CH DE DK ES FR GB GR IT LI LU NL SE							
DE 69115889	E	19960208	(199611)			C12N001-18	<--
FI 102188	B1	19981030	(199849)			C12N001-18	<--
CA 2074267	C	20020205	(200213)	EN		C12N001-16	<--

ADT ZA 9100336 A ZA 1991-336 19910116; CN 1054098 A CN 1991-100905 19910213;

FI 9203665 A WO 1991-FI47 19910215, FI 1992-3665 19920814; EP 515406 A1 EP 1991-903204 19910215, WO 1991-FI47 19910215; NZ 237119 A NZ 1991-237119 19910214; AU 643505 B AU 1991-72288 19910215; US 5427943 A Cont of US 1991-655816 19910215, US 1993-86467 19930706; EP 515406 B1 EP 1991-903204 19910215, WO 1991-FI47 19910215; DE 69115889 E DE 1991-615889 19910215, EP 1991-903204 19910215, WO 1991-FI47 19910215; FI 102188 B1 WO 1991-FI47 19910215, FI 1992-3665 19920814; CA 2074267 C CA 1991-2074267 19910215, WO 1991-FI47 19910215

FDT EP 515406 A1 Based on WO 9112315; AU 643505 B Previous Publ. AU 9172288, Based on WO 9112315; EP 515406 B1 Based on WO 9112315; DE 69115889 E Based on EP 515406, Based on WO 9112315; FI 102188 B1 Previous Publ. FI 9203665; CA 2074267 C Based on WO 9112315

PRAI FI 1990-804 19900216

REP DE 3625170; EP 259739; US 28276; US 3960664; US 4226940; US 4719114

IC ICM **C12N001-04; C12N001-16; C12N001-18**
ICS A21D008-04

AB WO 9112315 A UPAB: 19951019
High-density yeast compsn. comprises (by wt) 1-20% of a polyhydroxy-cpd. (I) and 80-99% of fresh yeast (II) and has density more than 800g yeast (227-29%) dry matter)/1 of prepn. with (I) concn. in the extracellular liq. 5-50% w/v. (I) is propylene glycol, glycerol, non-fermentable mono- or oligosaccharides (e.g. xylose) or sugar alcohols (e.g. mannitol or sorbitol), soluble oligo- or polymeric carbohydrates (e.g. partially hydrolysed **starch**, cellulose or agarose) and polyethylene glycol or mixts.

USE/ADVANTAGE - The compsn. has improved ability to retain its activity, dissolves instantly, and is easily batched, is uniformly suspendable and is tolerant of repeated **freezing** and **thawing**. The compsn. is useful in the prepn. of improved quality baker's brewer's distiller's and wine yeast. @(30pp Dwg.No.0/5)
0/5

FS CPI

FA AB; DCN

MC CPI: A12-W11L; D05-B; D05-B04; E07-A02A; E10-A07; E10-E04H

ABEQ US 5427943 A UPAB: 19950810
High density yeast prepn. comprises (a) 1-20 wt.% glycerol, and (b) 80-99 wt.% fresh compressed yeast each w.r.t. total.

Prepn. has density more than 800 g. of yeast per l. of prepn. Yeast has dry matter content of 27-29%. Concn. of glycerol is extracellular liq. of the fresh yeast is 5-50% w/v.

USE - Used as brewer's yeast, sourdough yeast, wine yeast, baker's yeast or distiller's yeast, which can retain its activity, dissolve instantly, be easily batched, is uniformly suspendable and tolerable to repeated **freezing** and **thawing** (claimed).
Dwg.0/5

ABEQ EP 515406 B UPAB: 19960205
A high-density liquid or pasty yeast preparation having a capability of retaining its activity, dissolving instantly and being easily batched, uniformly suspendable and tolerant of repeated **freezing** and **thawing**, and comprising 1-20% (w/w) of a polyhydroxy compound selected from a group comprising propylene glycol, glycerol, nonfermentable mono- or oligosaccharides such as xylose, or non-fermentable sugar alcohols such as mannitol and sorbitol, soluble oligo- or polymeric carbohydrates such as partially hydrolysed **starch**, cellulose or agarose or derivatives thereof and polyethylene glycol, or mixtures thereof, and 80-99% (w/w) of fresh yeast, said high-density yeast preparation having a density of more than 800 g yeast (27-29% dry matter) per 1 liter of the yeast preparation, the concentration of the polyhydroxy compound in the extracellular liquid being 5-50% (w/w).
Dwg.0/5

L78 ANSWER 14 OF 18 WPIX (C) 2003 THOMSON DERWENT

AN **1989-265272** [37] WPIX
DNC **C1989-117614**
TI Non-retro grading **starch** derivs. - obtd. by degradation, pref. with beta-amylase, and are useful as gum arabic replacements.
DC A11 A97 D13 D16 D17 F06 G02
IN CHIU, C; CHUNGWAI, C; CHUNG-WAI, C
PA (NATT) NAT STARCH & CHEM CORP; (NATT) NAT STARCH & CHEM INVESTMENT
CYC 26
PI EP 332027 A 19890913 (198937)* EN 18p
R: AT BE CH DE ES FR GB IT LI
DK 8901165 A 19890912 (198946)
NO 8901039 A 19891009 (198946)
FI 8901091 A 19890912 (198949)
PT 89979 A 19891110 (198950)
AU 8934762 A 19900222 (199014)
JP 02055702 A 19900226 (199014)
ZA 8903377 A 19900627 (199030)
CN 1040374 A 19900314 (199050)
US 4977252 A 19901211 (199101)
US 5185176 A 19930209 (199308) 9p A23L001-222
IL 90061 A 19930922 (199349) C08B030-12 <--
KR 9210521 B1 19921204 (199414) C08B031-00
NO 175262 B 19940613 (199427) C08B031-00
CA 1333894 C 19950110 (199511) C12P019-22
PH 27035 A 19930201 (199635) C08B031-04
JP 2540204 B2 19961002 (199644) 10p C08B031-04
EP 332027 B1 20010207 (200109) EN C08B030-12 <--
R: AT BE CH DE ES FR GB GR IT LI LU NL SE
DE 68929281 E 20010315 (200122) C08B030-12 <--
ES 2155432 T3 20010516 (200138) C08B030-12 <--
ADT EP 332027 A EP 1989-103504 19890228; JP 02055702 A JP 1989-93314 19890414; US 4977252 A US 1988-234070 19880818; US 5185176 A CIP of US 1988-167051 19880311, Div ex US 1988-234070 19880818, US 1990-522005 19900510; IL 90061 A IL 1989-90061 19890424; KR 9210521 B1 KR 1989-6094 19890508; NO 175262 B NO 1989-1039 19890310; CA 1333894 C CA 1989-592893 19890306; PH 27035 A PH 1989-38285 19890306; JP 2540204 B2 JP 1989-93314 19890414; EP 332027 B1 EP 1989-103504 19890228; DE 68929281 E DE 1989-629281 19890228, EP 1989-103504 19890228; ES 2155432 T3 EP 1989-103504 19890228
FDT US 5185176 A Div ex US 4977252; NO 175262 B Previous Publ. NO 8901039; JP 2540204 B2 Previous Publ. JP 02055702; DE 68929281 E Based on EP 332027; ES 2155432 T3 Based on EP 332027
PRAI US 1988-167051 19880311; US 1988-234070 19880818
REP FR 1570132; GB 1160356; US 4035235
IC ICM A23L001-222; **C08B030-12**; C08B031-00; C08B031-04; C12P019-22
ICS A23L001-035; A23L001-05; A23L001-052; A23L001-19; A23L001-195; B01F017-48; C08B031-16; C08B033-02; C08B037-18; **C08L003-02**; **C12N009-26**; C12P019-20
AB EP 332027 A UPAB: 19930923
A modified **starch** is claimed whose emulsions are characterised by improved stability and resistance to oiling and gelling during storage. The **starch** is a dersiv. contg. a hydrophobic gp. (or hydropticlic and hydrophobic gps) of which up to 70 wt.% has been degraded by an excoenzyme capable of cleaving 1,4-alpha-D-glucosidic linkages from non-reducing 1,6-alpha-glucosidic linkages. Claimed prepn. is by degrading the gelatinised **starch** deriv. to maltose, pref. using beta-amylase. Derivatisation to give the hydrophobic (and opt. also hydrophilic) gps. may be before or after the degradation.

USE/ADVANTAGE - Emulsions for industrial application (specifically food prod. or beverage emulsions) contg. the modified **starch** deriv. are claimed. The deriv. is useful as a replacement for gum arabic, showing stability during shelf-storage, refrigeration and **freeze /thaw** cycles. It is esp. useful in beverages flavoured with eg. citrus oils, being resistant to retrogradation.

0/0
FS CPI
FA AB
MC CPI: A03-A; A10-E05; A12-W09; D03-H01J; D05-C08; F01-H06A; F05-A06B; G03-B02A
ABEQ US 4977252 A UPAB: 19930923
Modified **starch** having emulsification properties whose emulsions have improved stability and resistance to oiling and gelling during storage, comprising a **starch** deriv. contg. a hydrophobic gp. or both a hydrophilic gp. and a hydrophobic gp. of which up to 70 wt.% has been degraded by an exo-enzyme capable of cleaving 1,4-alpha-D-glucosidic linkages from non-reducing ends of the **starch** but incapable of cleaving 1,6-alpha-D-glucosidic linkages of the **starch**.

The **starch** is acid or heat-converted, or converted by alpha-anylase to a WF of up to about 60. The exo-enzyme is beta-amylase. The **starch** is a waxy maize **starch**. The **starch** is pref. gelatinised and has been derivatised by treatment with at least 0.25% octenylsuccinic acid anhydride on a **starch** dry wt. basis. The **starch** is further derivatised to contain hydroxy-propyl gps.

USE/ADVANTAGE - The modified **starch** is used particularly in foods and beverages contg. flavour oil emulsions. Emulsifying agents are used in food, cosmetics, paint, pharmaceutical, polymer industries, etc. The **starch** emulsifier has improved shelf stability.

ABEQ US 5185176 A UPAB: 19930923
Food prod. comprises an emulsion which is prepd. using a **starch** deriv. contg. a hydrophobic gp. (and opt. a hydrophilic gp.) of which 70 wt.% or less has been degraded to maltose by reacting with an exoenzyme which can cleave 1,4-alpha- D-glucosidic linkages from non-reducing ends of **starch** but not 1,6-alpha- D-glucosidic linkages of **starch** itself.

Beverage flavour concentrate comprises the emulsion, flavouring oil(s), sweetener(s) and water.

ADVANTAGE - Has improved stability and resistance to oiling and gelling during storage.

0/0

L78 ANSWER 15 OF 18 WPIX (C) 2003 THOMSON DERWENT
AN **1987-001902** [01] WPIX
DNN **N1987-001421** DNC **C1987-000778**
TI Beta-1,3-glucan polysaccharide gel with uniform structure and pH - prepd. by critical temp. neutralisation, useful e.g. as coating for pharmaceuticals and carrier for biological materials.
DC A11 A96 B04 D13 D16 D21 D22 P81
IN PROVONCHE, R B; RENN, D W
PA (FMCC) FMC CORP
CYC 5
PI GB 2176795 A 19870107 (198701)*
DE 3621303 A 19870108 (198702)
SE 8602805 A 19861226 (198707)
JP 62030102 A 19870209 (198711)
US 4774093 A 19880927 (198841) 7p
GB 2176795 B 19890906 (198936)
ADT GB 2176795 A GB 1986-615339 19860624; DE 3621303 A DE 1986-3621303 19860625; JP 62030102 A JP 1986-147253 19860625; US 4774093 A US 1985-748526 19850625; GB 2176795 B GB 1986-15339 19860624
PRAI US 1985-748521 19850625
IC A61K007-16; A61K047-00; B01J013-00; C08B037-00; **C08L003-02**; **C12N001-20**; **C12N009-24**; **C12N011-10**; **C12N015-00**; C12P019-04; C12R001-05; G02B001-04; G02C007-04
AB GB 2176795 A UPAB: 19930922
A new beta-1,3-glucan polysaccharide (I) gel has a coherent, uniform, non-particulate structure and substantially uniform pH throughout. Particularly (I) is produced by a microorganism of the genera Alcaligenes

(esp. A faecalis) or Agrobacterium.

(I), normally insoluble in neutral aq. medium, is dissolved at 0.5-5 wt.% in aq. alkaline medium at 55 deg.C or lower, then the soln. adjusted to pH 10.5 or lower, at at least 50 deg.C when this soln. is cooled to below 40 deg.C it reversibly forms a high-strength gel. When heated above 50 deg.C, the soln. forms a gel irreversibly.

USE/ADVANTAGE - This gel is useful as a carrier for biological products and pharmaceuticals; as a coating for biological materials and for making disposable contact lens. Typical applications include support/sepn. media for electrophoresis, cell culture, affinity chromatography, etc.; in foods; medicinal films; slow-release pharmaceutical coatings; in heat-resistant toothpastes, etc.. Because of its uniformity, this gel provides improved sepn. of biological cpds. and can be used for pH-sensitive material. The gels have excellent stability towards autoclaving and **freeze-thaw** cycling.

0/0

FS CPI GMPI
FA AB
MC CPI: A03-A; A12-S; B04-C02F; B12-L04; B12-M02A; B12-M03; B12-M10A; D03-H; D09-C01A
ABEQ GB 2176795 B UPAB: 19930922

A method of preparing an aqeuous polysaccharide solution capable upon cooling below 40 deg.C, of forming a reversible, high strength gel and capable upon being heated above 50 deg.C of forming a thermally irreversible, high strength gel, the gel having a coherent, uniform, non-particulate structure and a substantially uniform pH throughout, which comprises: dissolving a beta-1,3-glucan polysaccharide, normally insoluble in neutral aqueous medium, but soluble in alkaline aqueous medium, in an aqueous alkaline medium at a temperature of 55 deg.C or below to provide a solution thereof; and while maintaining the solution at a temperature of at least 50 deg.C but lower than the decomposition temperature of the polysaccharide, adjusting the pH of the solution to 10.5 or lower.

ABEQ US 4774093 A UPAB: 19930922

Novel beta-1,3-glucon polysaccharide gel has (a) coherent uniform non-particulate structure, with (b) a uniform pH throughout. Prodn. is biological from the microorganism Alcaligenes faecalis var. myxogenes. Aq. polysaccharide soln. which can cool below 40 deg. C to form a reversible high strength gel, and also form a thermally irreversible high strength gel upon heating above 50 deg. C, is prepd. from the polysaccharide which is insoluble in neutral aq. medium but soluble in alkaline aq. medium, by (i) dissolving in aq. alkaline medium at 55 deg. C or less to form soln.; and (ii) maintaining soln. at 50 deg. C to less than its decomposition temp., and adjusting to pH10.5 or less.

USE - In prodn. of a disposable contact lens.

L78 ANSWER 16 OF 18 WPIX (C) 2003 THOMSON DERWENT
AN **1980-69839C** [40] WPIX
TI Colloidal antifreeze agent of hydroxyethyl **starches** - allows quicker and more intense **freezing** and preservation of blood cells without affecting biological activity.
DC A11 A96 D22
IN BEEZ, M; DIRKS, E; KRICK, G
PA (FREP) FRESENIUS CHEM PHARM IND EDUARD; (FREP) FRESENSIUS E CHEM-PHARM
CYC 3
PI DE 2908436 A 19800925 (198040)*
GB 2046772 A 19801119 (198047)
FR 2450632 A 19801107 (198051)
GB 2046772 B 19830525 (198321)
PRAI DE 1979-2908436 19790305
IC A01N001-02; A61K035-14; B01J013-00; **C08L003-08**; **C12N005-02**
AB DE 2908436 A UPAB: 19930902

A colloidal antifreeze agent consisting of hydroxy ethyl **starches**

(HES) is new. The HES pref. comprises at least 90% of amylopectin hydrolysate and pref. has a specific viscosity of 0.05-0.30 dl/g at 25 degrees C, an ether substn. degree of up to 0-90 hydroxyethyl gps. per **starch** molecule and mixt. 30,000-700,000. The ethylene glycol part of the HES is pref. <0.5 pts. wt. ethylene glycol per 100 pts. modified **starch**. Pref. the HES is mixed with polyvinylpyrrolidone and glycerine, and 1-50% HES solns. are used.

The antifreeze agent can be used in the (cryoconservation) **freeze** preservation of erythrocytes, thrombocytes, leucocytes, bone marrow cells and cells from other organs, without affecting their biological activity. The **freezing** and **thawing** processes are simplified and there is no need to wash the **thawed** cells. The antifreeze agent allows the prepn. of special **freezing** concentrates with exceptional **freezing** rate and **freezing** intensity, but which do not cause great cell losses.

FS CPI
FA AB
MC CPI: A10-E08C; A12-V; D05-H

L78 ANSWER 17 OF 18 WPIX (C) 2003 THOMSON DERWENT
AN **1979-36018B** [19] WPIX
TI Glutinous rice cracker prodn. - by **freezing starch** material, **thawing** it and mixing it with rice.
DC D11
PA (KOMI-I) KOMIYA Y
CYC 1
PI JP 54041362 A 19790402 (197919)*
PRAI JP 1977-105696 19770901
IC A23G003-00
AB JP 54041362 A UPAB: 19930901
The method comprises (1) **freezing** the **starch**-material paste, such as sweet **potato starch** or sake less, for 1 night, (2) **thawing** it and (3) mixing it with rice.

A cracker having food texture can be produced using large amts. of **starch** material. By **freezing** and **thawing** the **starch** material, amylopectin and amylose are sepd. and the texture of the cracker can be improved.

FS CPI
FA AB
MC CPI: D03-H01

L78 ANSWER 18 OF 18 WPIX (C) 2003 THOMSON DERWENT
AN **1974-43730V** [24] WPIX
TI **Starch** extn. from water-contg. raw materials - eg slurries of **tubers**, roots and unripe fruit, by introducing **freezing-thawing** step to increase yields.
DC D17
PA (SEID-I) SEIDEMANN J
CYC 1
PI DD 104811 A 19740320 (197424)*
PRAI DD 1973-171424 19730608
IC C13L001-00
AB DD 104811 A UPAB: 19930831
Introduction of a **freeze-thaw** step after washing, peeling and comminution, increases **starch** yields. Sepd. pulp is almost free from **starch** attached to fibres or protein. Parameters should be chosen so as to form larger ice crystals followed by destruction of tissue cells after **thawing** so that **starch** can be washed well out of pulp. Process is used for aq. slurries of **potatoes**, sweet **potatoes**, manioc, yams, unripe apples etc., and can be applied to dried raw materials, e.g. **potato** and manioc flour, by slurrying with water in up to 1:30 ratio.
FS CPI

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FA   AB
MC   CPI: D06-H


=> d his

     (FILE 'HOME' ENTERED AT 10:26:49 ON 25 APR 2003)
               SET COST OFF

     FILE 'REGISTRY' ENTERED AT 10:27:54 ON 25 APR 2003
L1             1 S STARCH/CN
L2             1 S AMYLOSE/CN
L3          2903 S STARCH
L4          2902 S L3 NOT L1,L2
L5          2286 S L4 NOT SQL/FA
L6           983 S L5 NOT (COMPD OR WITH OR (MXS OR MNS OR IDS)/CI)

     FILE 'HCAPLUS' ENTERED AT 10:29:11 ON 25 APR 2003
L7         56936 S L1
L8        117387 S L6
L9        135249 S STARCH?
L10       137106 S ?STARCH?
L11       239981 S L7-L10
L12        14072 S L11 AND POTATO?
               E POTATO/CT
L13        14247 S E3
L14         5549 S E28
               E E28+ALL
L15        24454 S E16,E17,E15+NT
L16         3327 S L11 AND L13-L15
L17        14072 S L12,L16
L18         6021 S L1 (L) PRP/RL
L19          187 S L1 (L) PUR/RL
L20         1313 S L1 (L) (BMF OR BPN OR IMF OR PNU OR SPN)/RL
L21         2945 S L1 (L) PREP/RL
L22         1508 S L17 AND L18-L21
L23          989 S L22 AND L18
L24           51 S L23 AND (FREEZ? OR FROZ?)
L25           15 S L23 AND THAW?
L26          473 S L23 AND (TEMPERATURE OR HEAT? OR COLD? OR COOL? OR THERMAL?)
L27           31 S L26 AND L24
L28           15 S L25 AND L24,L26

     FILE 'REGISTRY' ENTERED AT 10:38:13 ON 25 APR 2003
L29            1 S GLUCAN/CN

     FILE 'HCAPLUS' ENTERED AT 10:38:17 ON 25 APR 2003
L30          292 S (L2 OR L29 OR AMYLOSE OR GLUCAN) AND L23
L31           15 S L30 AND L24
L32            5 S L30 AND L25
L33          165 S L30 AND L26
L34           25 S L28,L31,L32
               E WESTCOTT R/AU
L35           18 S E5,E10,E11
               E JOBLING S/AU
L36           28 S E3-E6
               E SCHWALL G/AU
L37           10 S E3-E6
               E WO2000-GB3522/AP,PRN
L38            1 S E3,E4
               E GB99-21830/AP,PRN
L39            1 S E4
L40           13 S L35-L39 AND L11
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L41          12 S L40 AND L17
L42           1 S L40 NOT L41
L43          35 S L34,L38,L39,L41
L44          23 S L43 AND (PD<=20000913 OR PRD<=20000913 OR AD<=20000913)
                SEL DN AN 3 18 23
L45          20 S L44 NOT E1-E9
L46          22 S L41,L45
L47          22 S L46 AND L7-L28,L30-L46
L48          22 S L47 AND (AMYLO? OR GLUCAN OR ?STARCH? OR FREEZ? OR FROZ? OR T
L49          22 S L48 AND L7,L8,L29,L3
                SEL HIT RN

     FILE 'REGISTRY' ENTERED AT 11:00:11 ON 25 APR 2003
L50           8 S E10-E17

     FILE 'HCAPLUS' ENTERED AT 11:00:52 ON 25 APR 2003

     FILE 'REGISTRY' ENTERED AT 11:01:05 ON 25 APR 2003

     FILE 'WPIX' ENTERED AT 11:01:17 ON 25 APR 2003
                E WO2000-GB3522/AP,PRN
L51           1 S E3
                E GB99-21830/AP,PRN
L52           1 S E4
L53           1 S L51,L52
L54         941 S C08B030/IC,ICM,ICS
L55        2601 S C08L003/IC,ICM,ICS
L56        1076 S D06-H01/MC
L57        3143 S (B04-C02B OR C04-C02B OR B04-C02B2 OR C04-C02B2)/MC
L58        4518 S 1863/DRN OR R01863/DCN
L59       42758 S ?STARCH?/BIX
L60       45402 S L54-L59
L61        1863 S L60 AND (FREEZ? OR FROZ?)/BIX
L62         356 S L61 AND (THAW? OR DEFROST? OR DE FROST?)/BIX
L63          44 S L62 AND (?POTATO? OR ?TUBER? OR SOLAN?)/BIX
L64        2742 S L60 AND C12N/IC,ICM,ICS
L65         458 S L60 AND (D05-H14B3 OR D05-H16B)/MC
L66          20 S L64,L65 AND L62
L67           3 S L63 AND L66
                SEL DN AN 3 5 7 8 9 17 18 19 20 L66
L68           9 S L66 AND E1-E20
                SEL DN AN L67 1 2
L69           2 S E21-E24
L70           9 S L68,L69,L53 AND L51-L69
L71          41 S L63 NOT L66
                SEL DN AN L71 AB 6 8 38 41
                DEL SEL
                SEL DN AN L71 6 8 38 41
L72           4 S E1-E6
L73          13 S L70,L72 AND L51-L72
                E JOBLING S/AU
L74           8 S E4
                E SCHWALL G/AU
L75           3 S E4
                E WESTCOTT R/AU
L76           8 S E3,E6
L77           6 S L74-L76 AND L60
L78          18 S L73,L77
L79           5 S L74-L76 NOT L78

     FILE 'WPIX' ENTERED AT 11:20:50 ON 25 APR 2003
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